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No. 98 992

IN THE

# Supreme Court of the United States

OCTOBER TERM, 1998

BOB T. MOORE and SUSAN MOORE,

*Petitioners,*

*vs.*

ASHLAND CHEMICAL, INC. and ASHLAND OIL, INC.,

*Respondents.*

ON PETITION FOR WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

# PETITION FOR WRIT OF CERTIORARI

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# QUESTIONS PRESENTED

1. Under Rule 702 of the Federal Rules of Evidence, may a clinical medical doctor testify as to the cause of a patient's injury or disease when his opinion is grounded in specialized knowledge, personal experience and clinical methodologies and the processes customarily employed by medical doctors in clinical medicine?

2. Whether the court of appeals erred in not applying an abuse of discretion standard of review when the court did not consider the particulars of respondents' motion to exclude the causation testimony of petitioners' expert witness and the deposition testimony and other evidence submitted on that motion and when it did not consider the particulars of the district court's justifications for its ruling on that motion and instead conducted a plenary review designed to justify the exclusion on any grounds.

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Petitioners pray for a writ of certiorari issue to review the judgment of the United States Court of Appeals for the Fifth Circuit entered in this case on August 14, 1998.

## OPINIONS BELOW

The panel opinion of the court of appeals (App. 53a) is reported at 126 F.3d 679. The order of the court of appeals granting rehearing en banc (App. 51a) is reported at 126 F.3d at 716. The en banc opinion of the court of appeals (App. 1a) is reported at 151 F.3d 269. The order of the court of appeals denying rehearing (App. 143a) is unreported. The oral ruling of the district court (App. 140a) is unreported.

## STATEMENT OF JURISDICTION

The judgment of the en banc court of appeals was entered on August 14, 1998. A. 1a. The timely filed petition for rehearing was denied on September 18, 1998. A. 143a. This Court has jurisdiction pursuant to 28 U.S.C. § 1254(1).

## RULES INVOLVED

Rule 104(a) "Questions of admissibility generally" of the Federal Rules of Evidence provides that:

> Preliminary questions concerning the qualifications of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b). In making its determination it is not bound by the rules of evidence except those with respect to privileges.

Rule 702 "Testimony by Experts" of the Federal Rules of Evidence provides that:

> If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

## STATEMENT OF THE CASE

Petitioners, a delivery truck driver for a motor freight company and his wife, sued the premises owners of a chemical distributor of industrial chemicals for personal injuries resulting from his exposure to industrial chemicals while he was on those premises making a regular delivery. The drums of industrial chemicals being delivered leaked resulting in a spill on the trailer. Respondents' plant manager declined to test the air on the trailer for harmful contaminants, declined to show petitioner a copy of the MSDS for the chemicals, refused petitioner's specific request for a respirator, and refused to allow the truck to leave the premises until petitioner cleaned up the chemical spill on the trailer. In the one hour of exposure to the industrial chemicals while working on the non-ventilated trailer, petitioner developed reactive airways disease ("RADS"), an asthma-like disease caused by exposure to irritant chemicals. The lawsuit was removed by respondents to the United States District Court for the Southern District of Texas, asserting diversity jurisdiction under 28 U.S.C. § 1332. Before trial the district court granted respondents' motion in limine precluding the presentation of the testimony of petitioners' principal medical expert witness as to causation, Dr. Daniel E. Jenkins until further order of the court. The district court's oral ruling was based on its review of Dr. Jenkins' deposition testimony which was submitted with respondents' motion. That ruling was that Dr. Jenkins' causation testimony was unreliable and inadmissible unless the court was presented with scientific literature establishing a causal link between exposure to the toluene mixture and RADS. A. 140a. It reserved decision on the admissibility of his causation testimony to give Moore an opportunity to present Dr. Jenkins' live testimony to satisfy the court's ruling.

Dr. Jenkins' testimony established that Dr. Jenkins had over forty years of experience in pulmonary and environmental medicine as Chief of the Pulmonary Disease Section and later as Chief of the Environmental Medicine Section at Baylor College of Medicine and that he had diagnosed the cause of over 100 patients' injuries from exposure to inhalation of industrial chemicals in occupational settings. A. 46a n.7. "Dr. Jenkins had previously treated other patients whose RADS he attributed to exposure to chemicals that were known to irritate the airways." A. 7a. Dr. Jenkins saw Moore as a patient in his office three times shortly after the accidental exposure, which was 1-1/2 years before this lawsuit was commenced. Dr. Jenkins examined Moore and performed clinical tests and procedures according to clinical medicine to diagnose the cause of Moore's disease. A. 44a n.6. Dr. Jenkins testified in his deposition in detail as to his clinical diagnosis of Moore and as to how he estimated the level of Moore's exposure to the toluene mixture identified by the MSDS to be 200 parts per million or higher for a duration of 45 to 60 minutes. A. 42a n.5. Dr. Jenkins testified from his specialized medical knowledge, personal clinical experience and clinical methodology and the medical literature that Moore's RADS was caused by his exposure to the toluene mixture. He also testified that any irritant chemical can cause RADS. He identified two of the sources of literature that he relied upon as Carl Zenz, M.D., et al., *Occupational Medicine* (2d ed. 1988) and Stuart M. Brooks, M.D., et al., *Reactive Airways Dysfunction Syndrome (RADS)*, 88 Chest 376 (1985). A. 18a, 91a. All the chemicals disclosed in the MSDS are known to be irritant chemicals which he verified by references. He testified that the chemical nature of toluene mixture is similar to that of chemicals found in studies to have caused RADS and that other RADS patients he had diagnosed were exposed to similar chemicals. A. 86a. After hearing Dr. Jenkins' testimony out of the presence of the jury, the district court adhered to its earlier ruling that Dr. Jenkins' testimony as to causation was not reliable and not admissible under Fed. R. Evid. 702 because he had no medical literature that said the exposure to the toluene mixture caused RADS. The jury's verdict was that the negligence of respondents did not proximately cause the injuries. A divided panel of the court of appeals reversed and remanded this case for a new trial, holding that Dr. Jenkins' causation testimony was admissible and its exclusion affected the substantial rights of petitioners. On its own motion, the en banc court of appeals ordered a rehearing en banc. The en banc court of appeals affirmed the judgment of the district court, holding that Dr. Jenkins' causation testimony was unreliable and not admissible under *Daubert*.

## A. The District Court's Ruling

Ashland's motion to exclude Dr. Jenkins' expert testimony presented two grounds: (1) that Dr. Jenkins had no scientific confirmatory literature that the toluene mixture was capable of causing RADS, and (2) that Dr. Jenkins had no direct evidence as to the level of Moore's exposure to the chemicals. A. 44a. The district court's oral ruling was that Dr. Jenkins' causation testimony as to causation was unreliable. The court specifically enumerated two reasons: "Number One . . . [Dr. Jenkins] had no such literature or research to back up such causation determination." "Number Two . . . when asked about the specific substances detailed in the medical literature where exposure had led to reactive airways disease, Dr. Jenkins admitted that those were much more harmful chemicals." A. 141a. The district court also ruled that the testimony was excluded under Fed. R.

Evid. 403 because Dr. Jenkins' unique qualifications would likely influence the jury to believe his testimony. A. 141a. In other unenumerated statements the district court also stated that since the MSDS is in evidence and it states that the toluene mixture are irritants to the throat and nose and may injure the lungs, Dr. Jenkins' testimony is unnecessary, and that Dr. Jenkins had no direct evidence as to the level of exposure. The district court stated that Dr. Jenkins' clinical methodology in diagnosing Moore was "not what's at issue in determining the basis for his opinion as to causation." A. 142a.

### B. The Court of Appeals' Reversal

A divided panel of the court of appeals reversed. A. 53a. The panel held that the focus of the reliability inquiry as to Dr. Jenkins' causation testimony was whether his testimony was soundly grounded in the processes customarily employed in his particular field and specialty in clinical medicine. It held that "the opinion of Dr. Jenkins was soundly grounded in the principles, experience and methodology of his discipline." A. 101a. It followed the Second, Third, Fourth and other circuits to hold that a clinical physician may, consistently with *Daubert*, express an opinion based on specialized medical knowledge, personal clinical experience and clinical medical methodology, which is accepted within that discipline, that a particular inhalant chemical caused a patient's disease, without hard scientific corroboration. It was unnecessary for the panel to consider the narrow issue raised by the district court of whether there was scientific literature to support a causal link between the toluene mixture and RADS.

The panel summarized in detail Dr. Jenkins' deposition and trial testimony as to the basis for his opinion on causation in seven categories consisting of 3½ pages of the opinion. Those categories were that Dr. Jenkins

> 1) Examined Moore personally: . . ., 2) Personally took a detailed medical history from Moore: . . ., 3) Used Differential Diagnosis and Etiology: . . ., 4) Reviewed tests, reports and opinions of other doctors: . . ., 5) Reviewed the MSDS: . . ., 6) Referred to medical literature on the properties of irritant chemicals that cause RADS: . . ., 7) Utilized his training and experience: . . . .

A. 88a-91a. The panel found that in diagnosing the cause of Moore's disease Dr. Jenkins had followed the principles and methods of clinical medicine including performing the criteria of a differential diagnosis. A. 103a. It held that Dr. Jenkins had as much information about the nature of the substances, the level of exposure and its duration than any expert could possibly have in an accidental inhalation case. A. 101a-103a. The panel held that the district court's ruling was based on errors of law, clearly erroneous factual findings and abuse of discretion. A. 99a-107a. The dissent stated that as a matter of law all expert testimony as to medical causation is scientific and governed by the *Daubert* factors. A. 126a.

### C. The En Banc Court of Appeals' Affirmance

A divided en banc court of appeals affirmed the district court's judgment. The majority adopted the reasoning of the dissent to the panel opinion that as a matter of law all expert testimony as to medical causation is scientific and must satisfy the *Daubert* factors. A. 44a n.6. It rejected the reasoning of the panel opinion that the focus of the inquiry was the discipline of the expert witness. The court rejected the holding of the panel that Dr. Jenkins' specialized medical knowledge, personal clinical experience and clinical medical methodology satisfied *Daubert*. It stated in effect that the panel opinion's holding as to the admissibility of Dr. Jenkins' testimony stood for a holding that expert testimony based solely on experience or training satisfies *Daubert*. A. 44a n.6. It held that in the Fifth Circuit expert testimony "based solely on experience or training" must satisfy the *Daubert* factors. It then applied the *Daubert* factors to Dr. Jenkins' causation testimony. It focused on the scientific literature to support a scientific expert's opinion that the exposure to the industrial chemicals can cause RADS. It found no contradictory literature. As to confirmatory literature, it found that there was such literature but that it was not a precise fit and therefore it did not support that testimony under the *Daubert* factors. The court stated the facts in barebone capsule form only as those facts concerned the basis for its holding. A. 2a-5a. The court also held as a matter of law that Dr. Jenkins was required to have direct evidence by scientifically accurate data of the level of Mr. Moore's exposure. A. 20a n.10. It also held as a matter of law that an MSDS can provide no support for a causation opinion, A. 19a, and that the temporal connection between exposure and outset of symptoms is entitled to "little weight". A. 19a.

Judge King concurred in the result. Judge Benavides, while concurring, stated that this case is "a close one" and the district court would not have abused its discretion if it had admitted Dr. Jenkins' causation testimony.

The dissent written by Judge Dennis was joined in by Judges Stewart and Parker. The dissent adopted and restated the reasoning and conclusions of the panel opinion. The dissent pointed out that "the present case does not involve 'junk science' . . .". A. 39a. The dissent stated that the majority opinion conflicts with the decisions of other circuits and well recognized scholarly commentary. Relying upon decisions from other circuits, including the Second, Third and Fourth Circuits, the dissent stated that the reliability of the testimony of a clinical medical doctor is assessed according to the processes customarily employed in the expert's own discipline of clinical medicine. It found that interpretation of Rule 702 was corroborated by recent scholarly commentary of Professor Michael Graham and others and by the report of the American College of Trial Lawyers, 157 F.R.D. 571 (1994). It stated that the majority opinion "retries" the Rule 104(a) determination by a de novo review rather than properly review the process of that determination under an abuse of discretion standard of review. A. 44a. The dissent stated that the majority was wrong in substituting its own erroneous rulings and reasons for those of the district court, and in disregarding the district court's errors of law, clearly erroneous factual findings and abuse of its discretion. Rehearing was denied. A. 143a.

## REASONS FOR GRANTING THE WRIT

### I. THE COURT OF APPEALS' DECISION CONFLICTS WITH DECISIONS OF THIS COURT AND OTHER COURTS OF APPEALS ON AN IMPORTANT MATTER OF INTERPRETATION OF FED. R. EVID. 702 AND THIS QUESTION OF FEDERAL LAW HAS NOT BEEN, BUT SHOULD BE, SETTLED BY THIS COURT.

The Fifth Circuit's opinion — holding that a clinical medical doctor's testimony on the issue of causation is unreliable and inadmissible under *Daubert* unless his testimony considered solely as a scientific expert opining on hard science satisfies the *Daubert* factors — conflicts with the decisions of other circuits that have written on the issue of the reliability of a clinical medical doctor's testimony as to causation on important questions of federal law as to the interpretation of Rule 104(a) and Rule 702 of the Federal Rules of Evidence. The Fifth Circuit's decision also conflicts with this Court's decisions in *Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 309 U.S. 579 (1993), and *General Electric Co. v. Joiner*, 118 S. Ct. 512 (1997). This issue has not been but should be settled by this Court. The correct interpretation of Rule 702 presents an important issue, particularly in view of the frequency with which this issue arises in the lower courts. Certiorari is also warranted because the decision below is erroneous. The Fifth Circuit's opinion is not in the mainstream of the current circuit-level decisions and it is contrary to recent scholarly commentary. It is unique in creating and imposing a special rule for the admissibility of expert testimony that concerns medical causation. It is a draconian result-oriented decision intended to establish the Fifth Circuit in the prohibited role as "super-expert" intended "to scrutinize experts in such a way as to exclude all but the perfect expert testimony." *See* 2 Stephen A. Saltzburg, Michael M. Martin & Daniel J. Capra, *Federal Rules of Evidence Manual* 1237-1240 (7th ed. 1998).

As stated in the dissent there were two grounds stated in respondents' motion for the exclusion of Dr. Jenkins' causation testimony: (1) the alleged lack of confirmatory scientific literature of a causal link, and (2) the alleged lack of direct evidence of the level of the exposure. A. 44a. Ashland's motion did not challenge Dr. Jenkins' specialized knowledge, clinical experience or his clinical methodology in his diagnosis of the cause of the disease or that this diagnosis of the cause was within the processes customarily employed by medical doctors in his field of clinical medicine. A. 46a-47a. While the court of appeals based its holding on its conclusion that as a matter of law expert testimony as to medical causation is scientific and subject to the *Daubert* factors, it also commented that "Dr. Jenkins gave no reason why" his "training and experience and his examination and tests" "were helpful in reaching his conclusion on causation." A. 18a. However, there was no issue raised by Ashland's motion as to that aspect of Dr. Jenkins' causation opinion and the district court did not base the exclusion on that grounds. 46a-47a. The court of appeals' statement was contradicted by other statements including that: "Dr. Jenkins' qualifications are outstanding." A. 6a n.2. "Dr. Jenkins previously treated other patients whose RADS he attributed to exposure to chemicals that were known to irritate the airway." A. 7a. The MSDS stated that the chemicals were irritants to the respiratory tract and lungs.

A. 2a n.1, 6a, 19a. The court's statement is contrary to the facts and analysis stated in the panel opinion and in the dissent to the en banc majority. A. 44a, 46a, 88a-91a.

The court of appeals held that the focus of the reliability inquiry was not on the clinical medical doctor's discipline and the processes customarily employed in that discipline including his specialized knowledge, personal experience and clinical methodology but rather the focus was on confirmatory scientific literature. A. 21a. It concluded that "it was within the judge's discretion to conclude that Dr. Jenkins' testimony was not grounded in science as required by *Daubert* and its progeny . . ." A. 22a. The court of appeals also erroneously held that Dr. Jenkins' technical expertise and clinical experience and methodologies of clinical medicine and medical literature could not support his specific opinion that any irritant chemical can cause RADS. A. 12a, 21a. It held that this opinion was also subject to the *Daubert* factors.

## A. The Decision Conflicts With Other Courts of Appeals' Decisions

Contrary to the majority opinion, the First, Second, Third, Fourth, Eight and D.C. Circuits have held that a clinical medical doctor may testify as to the cause of a patient's injury or disease when his opinion is grounded in the processes customarily employed by medical doctors in his field of clinical medicine including his specialized knowledge, personal experience and clinical methodologies.

**Second Circuit.** In *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038 (2d Cir. 1995), Judge McLaughlin writing for the Second Circuit was presented with similar facts to that presented in the court below and held that an expert opinion based upon medical expertise, clinical experience and clinical methodology satisfies Rule 702. The court of appeals held that the testimony as to medical causation of a clinical medical doctor (specialist in otolaryngology) was reliable as it was grounded in specialized knowledge and personal clinical experience and a range of factors utilized in his field of clinical medicine in diagnosing the cause of patient's injuries and diseases.[1] In that case the causation opinion was that the patient's vocal cord polyps were caused by her exposure to chemical fumes at her workplace. 61 F.3d at 1043-44. The clinical medical doctor based his opinion as to causation on "a range of factors" utilized in his clinical practice (61 F.3d at 1044) which are essentially identical to the range of clinical factors that Dr. Jenkins based his opinion upon. The Court stated that:

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[1] It is uniformly recognized that a medical doctor can testify based on, among other things, specialized knowledge, personal experience with the patient whose condition is in issue and with other patients with similar conditions, as

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> [Defendant] Fuller's contention that [Dr.] Fagelson did not base his opinion on "scientific knowledge" also fails. . . . [Dr.] Fagelson based his opinion on a range of factors, including his care and treatment of [plaintiff] McCullock; her medical history (as she related it to him and as derived from a review of her medical and surgical reports); pathological studies; review of Fuller's MSDS; his training and experience; use of a scientific analysis known as differential etiology (which requires listing possible causes, then eliminating all causes but one); and reference to various scientific and medical treatises. Disputes as to the strength of his credentials, faults in his use of differential etiology as a methodology, or lack of textual authority for his opinion, go to the weight, not the admissibility, of his testimony. *See* 113 S. Ct. at 2798 ("Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.").

61 F.3d at 1043-44. There was no direct evidence of the level of the exposure. The Court held that circumstantial evidence as to the level and duration of the exposure to the toxic chemical fumes was sufficient. 61 F.3d at 1045. In *Zuchowicz v. United States*, 140 F.3d 381 (2d Cir. 1998), the Second Circuit reaffirmed its holding in *McCullock*. In both *McCullock* and *Zuchowicz*, as in the court below, human exposure to the

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well as medical literature. *See* 4 J. McLaughlin, J. Weinstein & M. Berger, *Weinstein's Federal Evidence* § 703.03[1], at 703-7, 703-8 (1998); Paul D. Rheingold, *The Basis of Medical Testimony*, 15 Vand. L. Rev. 473, 478-514 (1962). "The clinical method always proceeds in a series of logical steps." 1 S. Pegalis & H. Wachsman, *American Law of Medical Malpractice 2d* § 3.9, at 152 (1992). The clinical technique of differential diagnosis is a time-proven scientific method to diagnose the cause of a disease. *Id.*

toxic substance in issue was a rare event so that there was no accumulated studies of its harmful effects. Unlike the majority below, the court of appeals properly dealt with the issue of admissibility of the clinical medical doctor's testimony under Rule 702 separately from the issue of the sufficiency of the evidence of causation under the applicable state law.

**Third Circuit.** In *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 752-71 (3d Cir. 1994), *cert. denied*, 115 S. Ct. 1253 (1995), the Third Circuit addressed the specialized medical knowledge and clinical experience and methodology of two clinical medical doctors in terms of the admissibility of their opinion on medical causation. Judge Becker writing for the court held that a clinical physician's technical expertise and experience and methodology of differential diagnosis was sufficiently reliable to support the admissibility of that expert's opinion as to causation. The Third Circuit applied the *Daubert* factors to that clinical methodology to hold that it satisfied the *Daubert* factors. 35 F.3d at 758. "[I]t is a method that involves assessing causation with respect to a particular individual." 35 F.3d at 758. While it is "a different type of science than science designed to produce general theories; it does not make it unreliable science." 35 F.3d at 758. It "is a technique that has widespread acceptance in the medical community, has been subject to peer review, and does not frequently lead to incorrect results. . . ." *Id.* In *Holbrook v. Lykes Bros. S.S. Co.*, 80 F.3d 777, 781-83 (3d Cir. 1996), and in *Kannankeril v. Terminix Int'l, Inc.*, 128 F.3d 802, 809 (3d Cir. 1997), clinical medical doctors' testimony grounded in clinical principles and methods were held to be reliable and admissible as to the diagnosis of the cause of plaintiffs' injuries or disease.

**Fourth Circuit.** In *Benedi v. McNeil-P.P.C., Inc.*, 66 F.3d 1378, 1384-85 (4th Cir. 1995), the court of appeals held that clinical expertise and experience and methodologies commonly used by clinical medical physicians in diagnosing patients were reliable. The court stated that: "We will not declare such methodologies invalid and unreliable in light of the medical community's daily use of the same methodologies in diagnosing patients." 66 F.3d at 1384.

**Eight Circuit.** In *Hose v. Chicago Northwestern Transp. Co.*, 70 F.3d 968, 973 (8th Cir. 1995), and in *Clark v. Heidrick*, 150 F.3d 912, 915 (8th Cir. 1998), the court of appeals held that clinical medical doctors' testimony as to causation based on technical expertise and clinical experience and methodology was reliable and admissible.

**D.C. Circuit.** In *Ambrosini v. Labarraque*, 101 F.3d 129, 139 (D.C. Cir. 1996), *cert. denied*, 117 S.Ct. 1572 (1997), the court of appeals held that clinical medical doctors could testify as to causation based on technical expertise and clinical experience and methodology.

**First Circuit.** In *Baker v. Dalkon Shield Claimants Trust*, 156 F.3d 248, 252-53 (1st Cir. 1998), the court of appeals held that defendants' expert witness, a clinical medical doctor and gynecologists, should have been allowed to testify based on technical expertise and clinical experience and the clinical method of differential diagnosis as that method is "widely used in medicine" and was reliable.

These conflicts justify the grant of certiorari to review the judgment below.

The narrower holding of the court of appeals' that a clinical medical doctor's testimony based on "experience or training" is not reliable unless it satisfies the *Daubert* factors, A. 12a n.6, also conflicts with decisions of other circuits on important questions of federal law as to the interpretation of Rule 104(a) and Rule 702 of the Federal Rules of Evidence. Review by this Court is therefore warranted on that narrower issue as well. As to the narrower issue, the following circuits, among others, have held that expert testimony based on experience and skill satisfy *Daubert* and Rule 702 and therefore conflict with the court below. *Carmichael v. Samyang Tire, Inc.*, 131 F.3d 1433, 1434 (11th Cir. 1997), *cert. granted*, 118 S. Ct. 2339 (1998); *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038, 1043 (2d Cir. 1995); *Lauria v. National R.R. Passenger Corp.*, 145 F.3d 593, 599 (3d Cir. 1998); *Talkington v. Atria Reclamelucifers Fabrieken BV*, 152 F.3d 254, 265 (4th Cir. 1998); *Compton v. Subaru of Am., Inc.*, 82 F.3d 1513, 1519 (10th Cir. 1996); *McKendall v. Crown Control Corp.*, 122 F.3d 803, 806 (9th Cir. 1997); *Desrosiers v. Flight Int'l of Fla., Inc.*, 156 F.3d 952, 960-61 (9th Cir. 1998).

As to this narrower issue, Rule 702 provides that where specialized knowledge (such as medical knowledge) will assist the trier of fact, a witness qualified as an expert by knowledge, skill, experience, training or education may testify. The expert's "background and practical experience qualify as 'specialized knowledge' gained through 'experience, training, or education. . . .'" *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038, 1043 (2d Cir. 1995). The *Daubert* factors should not be applied to expert testimony that is based on "conclusions drawn from past experience." 4 J. McLaughlin, J. Weinstein & M. Berger, *Weinstein's Federal Evidence* § 702.05[2], at 702-32 (1998). Rather, an expert's opinion based on experience is sufficient if the experience is "directly related to the subject matter." *Id.* § 702.06[3], at 702-38. As to the narrower issue of the clinical medical doctor's causation testimony based on experience and skill, the above decisions of the First, Second, Third, Fourth, Eight and D.C. Circuits also support the conclusion that an expert opinion based upon technical expertise and experience satisfies *Daubert* and Rule 702. In clinical medicine the "significant stature and expertise" in a medical specialty and the "thirty years of experience as a practicing, board-certified [specialist]" have been held to be evidence of the reliability of the expert's opinion.

> While such evidence usually goes to whether an expert has sufficient qualifications to testify, several circuits have treated it as circumstantial evidence as to whether the expert employed a scientifically valid methodology or mode of reasoning.

*Ambrosini v. Labarraque*, 101 F.3d 129, 140 (D.C. Cir. 1996), *cert. denied*, 117 S. Ct. 1572 (1997). *See Carroll v. Morgan*, 17 F.3d 787, 790 (5th Cir. 1994); 2 Stephen A. Saltzburg, et al., *Federal Rules of Evidence Manual* 1229 (7th ed. 1998).

As to the narrower issue, the question presented has similarity in part to that presented in *Carmichael v. Samyang Tire, Inc.*, 131 F.3d 1433 (11th Cir. 1997), *cert. granted*, 118 S. Ct. 2339 (1998). As the expert in *Carmichael*, Dr. Jenkins' testimony is not based on hard science. Unlike *Carmichael*, Dr. Jenkins' causation opinion was formulated prior to litigation in doing his day-to-day work and not as a hired-to-testify after-the-fact expert. Unlike *Carmichael*, Dr. Jenkins' testimony is also based on specialized knowledge within his discipline and is based on the methodology of that discipline. His specialized knowledge and clinical experience operate within the methodologies and the processes customarily employed by medical doctors in his field of clinical medicine. As in *Carmichael*, the *Daubert* factors do not apply to Dr. Jenkins' testimony.

### B. Recent Scholarly Commentary and the Proposed Amendment to Rule 702 Supports the Conclusion That the Clinical Medical Doctor's Testimony Is Reliable.

In Michael H. Graham, *The Daubert Dilemma: At Last A Viable Solution?* 179 F.R.D. 1, 13-14 (1998), Professor Graham states that:

> It is suggested that *Daubert* be interpreted to impose reliability screening with respect to "technical or other specialized knowledge" [whether acquired by experience or otherwise] . . . , based on an adequate foundation of facts, data, or opinions, including those reasonably relied upon under Rule 703, limited to a determination that the explanative theory is neither "speculative nor conjectural.

It is not speculative or conjectural when the expert's methodology or technique (explanative theory) "has gained widespread acceptance in the particular field to which [it] belongs or is shown to possess particularized earmarks to trustworthiness." *Id.* at 14. It is stated that:

> Generally speaking, particularized earmarks of trustworthiness should be found to be established if the expert's explanative theory [methodology or technique] is shown to have been derived and employed in a manner consistent with processes customarily employed by experts in the particular field, which can be stated in the alternative as: (1) adheres to the same standards for intellectual rigor demanded in the expert's professional work, (2) conforms to applicable professional standards employed outside the courtroom, (3) possesses the aura of proper expert methodology, or (4) is soundly grounded in the principles and methodology of the particular field. Herein lies the potential solution to the *Daubert* dilemma. *Clearly, several courts have already moved a considerable way toward the foregoing reasoning.*

*Id.* at 14-16 (emphasis in original). The cases that Professor Graham relied upon for the last statement included the original panel opinion in *Moore*. A. 53a:

> *Moore v. Ashland Chemical, Inc.* 126 F.3d 679, 682 (5th Cir. 1997) ("A trial judge assessing the reliability of the proffer of a clinical physician's expert testimony based on clinical medical knowledge should determine whether it is soundly grounded in the knowledge, principles and methodology of clinical medicine; the '*Daubert* factors', which are techniques derived from hard science methodology, are, as a general rule, inappropriate for use in making the reliability assessment of expert medical testimony."). . . .

*Id.* at 16 n.25. Thus, the holding of the original panel opinion in *Moore* received Professor Graham's approval. Professor Graham specifically states as to expert testimony concerning clinical medical diagnosis and causation issues that:

> with respect to medical clinical diagnosis and causation issues, focusing on particularized earmarks of trustworthiness would be asking the trial judge to be ascertaining whether the given explanative theory [methodology or technique] was derived in a manner consistent with the processes customarily employed by experts in the field . . . [T]he trial court is looking toward experts in the particular field to which the explanative theory [methodology or technique] belongs to ascertain whether the explanative theory is sufficiently trustworthy, i.e. not speculative or conjectural, for the jury to consider. *Daubert*, so interpreted, would remove the trial judge from becoming an amateur scientist. The trial judge, as was true under *Frye*, would instead be looking toward the particular field in which the explanative theory belongs to inform the court as to whether the explanative theory is sufficiently trustworthy to be presented to the jury for its consideration.

*Id.* at 17-18.

The recent Proposed Amendment to Rule 702 was adopted from a proposal by Professor Michael Graham. *See* 2 Stephen A. Saltzburg, Michael M. Martin & Daniel J. Capra, *Federal Rules of Evidence Manual* 1251 (7th ed. 1998).[2] The Proposed Amendment to Rule 702, which extends the *Daubert* gatekeeping function to all experts, provides, in part, that expert testimony is reliable and admissible if "(2) the testimony is the product of reliable principles and methods. . . ." Committee on Rules of Practice and Procedure of the Judicial Conference of the United States, *Preliminary Draft of Proposed Amendments to the Federal Rules of Civil Procedure and Evidence* 122 (August 1998). The Committee Note indicates that the principles and methods are those of the expert's field or profession. *Id.* at 124-27. It is stated that the *Daubert* factors are not codified as many of the *Daubert* factors are unadaptable "outside the hard sciences. . . ." *Id.* at 126. "The proposed amendment does not distinguish between scientific and other forms of expert testimony." *Id.* at 127. "[T]he relevant factors for determining reliability will vary from expertise to expertise. . . ." *Id.* The Committee Note states that:

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[2] Professor Capra is the Reporter for Advisory Committee on Evidence Rules for the Judicial Conference's Proposed Amendment to Rule 702.

> Some types of expert testimony will not rely on anything like a scientific method, and so will have to be evaluated by reference to other standard principles attendant to the particular area of expertise. The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well-reasoned, and not speculative before it can be admitted. If there is a well-accepted body of learning and experience in the expert's field, then the expert's testimony must be grounded in that learning and experience to be reliable, and the expert must explain how the conclusion is so grounded.

*Id.* at 127. "While the terms 'principles' and 'methods' may convey one impression when applied to scientific knowledge, they remain relevant when applied to testimony based on technical or other specialized knowledge." *Id.* at 128. An example is given of testimony based on experience. It is stated that the method used by such an expert is the application of his extensive experience to analyze the specialized facts the subject of the testimony. *Id.* It is also stated that: "If the witness is relying solely or primarily on experience, then the witness must explain how that experience leads to the conclusion reached." *Id.* at 128.

In American College of Trial Lawyers, *Standards and Procedures for Determining the Admissibility of Expert Evidence After Daubert*, 157 F.R.D. 571, 577 (1994), it is stated that the testimony of an expert should be judged by the principles and methods applicable to his particular field.

> And the general acceptance of a methodology within a particular discipline will be crucial in many cases. . . . The inquiry to be made concerns the fundamental principles by which the validity of a methodology is to be judged in the particular field of knowledge.

*Id.* at 579.

In 2 Stephen A. Saltzburg, Michael M. Martin & Daniel J. Capra, *Federal Rules of Evidence Manual* 1237-1240 (7th ed. 1998), the authors, under the heading "Good testimony after *Daubert*", approvingly discuss decisions of the Second, Third, Fourth, Eighth, and D.C. Circuits, which approved expert testimony based on specialized medical knowledge and personal clinical experience and clinical methodology. It is stated that:

> It must be stressed that while *Daubert* assigns Trial Judges the role of gatekeepers, it does not authorize Trial Judges to act as "super-experts", or to scrutinize experts in such a way as to exclude all but the perfect expert testimony.

*Id.* at 1239. It is stated that:

> In most areas of non-scientific expert testimony . . . there are well-accepted practices and methodologies that are used. If the expert follows these accepted practices, the testimony will be found admissible without regard to *Daubert*. . . .

*Id.* at 1242. Further, that:

> If there is a well-accepted body of learning and experience in the field, then the expert's testimony must be grounded in that learning and experience to be reliable.

*Id.* at 1244. It is stated that:

> a scientific expert's testimony will be admissible if she employs the same methodology in reaching her conclusion as she would employ if working as a scientist in the real world. If the methodology is good enough for the real world, it is good enough for a trial. On the other hand, if the methodology is altered for the purposes of litigation, there is every reason to exclude it after *Daubert*. As Judge Posner has put it, the object of *Daubert* is to assure that "experts adhere to the same standards of intellectual rigor that are demanded in their professional work."

*Id.* at 1239. Stated another way: "The task of the gatekeeper after *Daubert* is to ensure that the expert reached her opinion by the same avenues that the expert uses in her day-to-day work." *Id.* at 1240. The authors discuss a case which presented similar facts to that presented in this petition: "Judge McLaughlin put it best in *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038 (2d Cir. 1995)." *Id.* They approvingly review in some detail the facts and holding in *McCullock* in which it was held that expert opinions — one a clinical medical doctor and the other an engineer — based upon technical expertise and experience and methodology satisfies Rule 702. The engineer based his testimony on his extensive practical experience and consideration of the facts in issue. The clinical medical doctor based his testimony on his clinical experience with the plaintiff and his specialized knowledge and clinical methods and procedures. They conclude that: "Under these circumstances, the Court found that any dispute as to the experts' lack of specialization, flaws in methodology, or lack of textual authority went to weight and not admissibility." *Id.*

The basic principle derived from the recent scholarly commentary by Professor Graham and Professors Saltzburg, Martin and Capra, and others, and the Proposed Amendment to Rule 702 is that the focus of the reliability inquiry is the expert's discipline. An expert's testimony is reliable and admissible if it was derived and employed in a manner consistent with processes customarily employed in the particular field of that expert. Stated another way by Professors Saltzburg, Martin and Capra, the expert who reaches his opinion by the same avenues that the expert uses in his day-to-day work should be allowed to testify. Where the expert reaches his opinion by specialized knowledge and personal experience and by the use of same methodology in reaching his testimony's conclusions as he would employ if working in the real world, his expert testimony is sufficiently reliable. A clinical medical doctor arrives at his opinion in the diagnosis of a patient's disease and its causes strictly by the same processes customarily employed in clinical medicine and he reaches his opinion by the same avenues that he uses in his day-to-day work. Dr. Jenkins' method was the application of his extensive clinical experience to clinically test Moore using standard clinical principles and methods to determine his disease and its cause. His method was reliable as it is trustworthy in his discipline. He followed the principles and methods of his field of clinical medicine to arrive at conclusions in his work which was unconnected to litigation. Therefore, his testimony is reliable and admissible.

Dr. Jenkins did not extrapolate from an accepted premise to an unfounded conclusion. Unlike the situation in *General Electric Co. v. Joiner*, 118 S. Ct. 512 (1997), which involved "far-removed animal studies" and irrelevant epidemiological studies, there was no analytical gap between the data and the opinion proffered. Dr. Jenkins relied upon his over forty years of experience in pulmonary and environmental medicine including that with other RADS patients and the extensive clinical data on Moore, and clinical diagnostic techniques, as well as Dr. Brooks article and Dr. Zenz's treatise, to formulate his opinion as to causation and that opinion was then utilized by Dr. Alvarez to treat Moore for RADS.

Accordingly, the Fifth Circuit is wrong on the law in holding that Dr. Jenkins' testimony as to causation was unreliable and inadmissible by the *Daubert* factors, because his testimony was adequately grounded in his specialized medical knowledge and personal clinical experience and clinical medical methodology and the processes customarily employed by medical doctors in his field of clinical medicine.

## C. The Decision of the Court of Appeals Is Erroneous

The district court's initial pre-trial ruling — a ruling which it adhered to at trial — was that Dr. Jenkins' testimony had to be grounded in science as the experts in *Daubert*, *i.e.*, hired-to-testify scientific experts. A. 140a. The district court's ruling was based on an erroneous view of the law that *Daubert* required that all experts be viewed as hired-to-testify scientific experts as the experts were in *Daubert*. Dr. Jenkins was a clinical medical doctor and his testimony was based on specialized medical knowledge, personal clinical experience and clinical methodology. His specialized knowledge and personal clinical experience operated within the methodologies and processes customarily employed in clinical medicine. Since the district court's ruling failed to consider Dr. Jenkins's field or discipline as the focus of the inquiry, its ruling is clearly erroneous. The court of appeals made the same errors of law.

By focusing on "medical causation", rather than the expert's discipline, the court of appeals made an error of law and based its opinion on an issue not before it. Whether there was sufficient evidence of medical causation for the case to go to the jury is an entirely different issue than that of the admissibility under Rule 702 of Dr. Jenkins' testimony as to causation. The former is controlled by the applicable state law in a diversity case and the latter is controlled by Rule 702. While if there had been insufficient evidence of causation in the record the district court could have granted judgment as a matter of law, that is a separate issue from the admissibility of the expert testimony. *See Raynor v. Merrell Pharmaceuticals, Inc.*, 104 F.3d 1371, 1374-75 (D.C. Cir. 1997), in which that court states its view that epidemiological evidence generally trumps non-epidemiological evidence and where the effects of exposure to toxic substances has been the subject of significant studies, clinical evidence is insufficient to establish causation. Such holdings are confusing the issue of the Rule 702 determination with the issue of whether or not there is sufficient evidence of causation to avoid a granting of judgment as a matter of law. The jury should hear the clinical expert testimony if it satisfies Rule 702. The district court can grant a judgment as a matter of law if the overwhelming epidemiological evidence is to the contrary.

The premise of the court of appeals' holding that a clinical medical doctor cannot testify to the cause of a patient's inhalation injuries from an accidental exposure to industrial chemicals without confirmatory scientific literature is not sound science. Many courts and legal commentary have employed common sense to recognize that the situation of a lack of confirmatory evidence to support a causation opinion is fundamentally different from the situation where there is contradictory evidence. Because there is a lack of data of the effects of human inhalation exposure to many industrial chemicals, including those here, the lack of confirmatory data does not scientifically prove anything. In that situation to hold that a person loses his claim for that reason simply penalizes him for having the misfortune to be exposed to chemicals without accumulated data. On the other hand, contradictory evidence is a different matter. Here, the only issue raised was that of a lack of confirmatory evidence. Ashland did not present any contradictory scientific evidence of any kind nor did it present any contradictory evidence as to Dr. Jenkins' specific opinion testimony that any irritant chemical can cause RADS. Different factual and policy considerations are presented in the situations presented here of isolated accidental inhalation injuries as opposed to situations of oral ingestion of drugs or, exposure to insidious and carcinogenic disease-causing substances requiring a latency period.[3]

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[3] Legal commentary has stated that "mass exposure cases differ from isolated exposure cases with respect to the nature and quality of scientific evidence that is necessary in order for the plaintiff to make out a submissible case on causation." Boston, *A Mass-Exposure Model of Toxic Causation: The Content of*

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Dr. Jenkins' opinion was formulated by the processes customarily employed in clinical medicine soon after the injury and some 1½ years before the commencement of the lawsuit. In fact, Dr. Jenkins' opinion that Moore's injuries arose from the exposure to the toluene mixture on Ashland's premises formed the basis for Moore's subsequent treatment by Dr. Alvarez. "The reliability requirement [of *Daubert*] is designed to exclude so-called 'junk science'. . . ." *See* 4 J. McLaughlin, J. Weinstein & M. Berger, *Weinstein's Federal Evidence* § 702.05[2], at 702-41 (1998). The decisions of the courts of appeals agree. For example, in *Binakonsky v. Ford Motor Co.*, 133 F.3d 281 (4th Cir. 1998), the court of appeals held that *Daubert* does not apply to the expert testimony as to the cause of the death given by a medical doctor-pathologist in part because ascertaining the cause was part of her work, experience and training and was done in her day-to-day work unconnected to any litigation. In *Watkins v. Telesmith, Inc.*, 121 F.3d 984, 991 (5th Cir. 1997), the court of appeals stated that the *Daubert* factors were intended to ascertain whether the expert is "a hired gun" or, on the other hand, a person whose opinion is generally accepted in his field or discipline. In *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1317 (9th Cir.), *cert. denied*, 116 S. Ct. 189 (1995), the court of appeals stated that the proponent of expert testimony can made a *prima facie* showing that the evidence satisfies Rule 702's reliability requirement by showing that the testimony grows out of pre-litigation work. Since junk science was not involved here, the court of appeals' analysis was wrong.

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*Scientific Proof and the Regulatory Experience*, 18 Colum. J. Envtl. Law 181, 381 (1993). "In the mass exposure litigation the . . . courts, for the most part, have demanded more compelling and rigorous proof of generic and individual causation than in isolated exposure litigation." *Id.* at 207.

> Those demands for proof reflect the greater availability of such evidence, the necessity for development of such evidence because of the greater public health concerns engendered by mass exposures, as well as concerns for uniformity, consistency, deterrence, and fairness.

*Id.* "Science knows less about the toxic properties of substances in [isolated exposure] litigation because there has been less need to learn the answers to the toxicity question: human exposures occur less frequently and are unintended." Boston, *Toxic Apportionment: A Causation and Risk Contribution Model*, 25 Envtl. Law 549, 622 (1995).

As stated in Part II below, the court of appeals' finding de novo that Dr. Brooks' article failed to reach conclusions and was speculative was clearly erroneous as that article did reach specific relevant conclusions and was not speculative.

The court of appeals erroneously held as a matter of law that an MSDS cannot support a clinical medical doctors' opinion unless he knows what tests were utilized in the preparation of the MSDS and what levels of exposure the tests were based on. A. 19a. The court of appeals stated no case authority or other authority to support its holding. The law does not support its holding. The MSDS is required by law (29 C.F.R. § 1910.1200(g)(5) (1989)) to contain scientifically accurate information as to each hazard determination. *See Dole v. United Steelworkers of America*, 494 U.S. 26, 30 (1990); *Martin v. American Cyanamid Co.*, 5 F.3d 140, 145 (6th Cir. 1993). It is generally accepted for clinical physicians to obtain and rely upon the contents of the MSDS.[4] *See, e.g., McCullock v. H.B. Fuller Co.*, 61 F.3d 1038, 1043-44 (2d Cir. 1995). By stipulation, the MSDS was in evidence and was relied upon without objection by both Moore's experts and Ashland's expert. *See* 22 C. Wright & K. Graham, *Federal Practice & Procedure* § 5194 (1978).

The court of appeals erroneously held that the temporal relationship between the exposure and the start of the symptoms of the disease has no significance to the clinical opinion. A. 19a. The court of appeals stated no case authority or other authority for its holding. The law does not support its holding: "the short time between exposure and injury may itself be enough for a scientist to draw a conclusion about causation." 2 Stephen A. Saltzburg, et al., *Federal Rules of Evidence Manual* 1234 (7th ed. 1998). The temporal relationship is one factor considered by the clinical medical doctor in the clinical methodology. It is also a matter of common sense. Under state law the temporal relationship between the exposure and the start of the symptoms of the injury or disease has been held to establish causation. *See Morgan v. Compugraphic Corp.*, 675 S.W. 2d 729, 733 (Tex. 1984). "We believe this evidence establishes a sequence of events from which the trier of fact may properly infer, without the aid of expert medical testimony, that the release of chemical fumes from the typesetting machine caused Morgan to suffer injury." *Id.* at 253.

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[4] *See* Carl Zenz, M.D., et al., *Occupational Medicine* 213, 220 (3d ed. 1994), in which it is stated that the clinical physician should obtain the MSDS to identify the chemicals that the patient was exposed to and "their physical and health effects."

The court of appeals erroneously held as a matter of law that direct evidence by scientifically accurate data of the level of the patient's exposure was required. A. 20a, 21a. The court of appeals stated no case authority or other authority for its holding. The law does not support its holding. There is no distinction between direct and circumstantial evidence. *See* 1 Michael H. Graham, *Handbook of Federal Evidence* § 401.1 (4th ed. 1996). Circumstantial evidence of the level of exposure is sufficient. *See, e.g., McCullock v. H.B. Fuller Co.*, 61 F.3d 1039, 1045 (2d Cir. 1995); *Kannankeril v. Terminix Int'l, Inc.*, 128 F.3d 802, 808 (3d Cir. 1997); *Hose v. Chicago Northwestern Transp. Co.*, 70 F.3d 968, 974 (8th Cir. 1995); *Holbrook v. Lykes Bros. S.S. Co.*, 80 F.3d 777, 780 (3d Cir. 1996). In the situation of injury from accidental inhalation of industrial chemicals in the workplace, circumstantial evidence is in fact the only evidence available. In such a situation, it is always impossible to produce direct evidence by scientifically accurate data of the level of exposure. The court of appeals overlooked important policy considerations. Requiring anything more than the best evidence available will encourage employers and premises owners to stop the current practice of maintaining meters to test the air for harmful contaminants. It will encourage them to never test the air when there is a suspected harmful contaminant in the air. According to the court of appeals' opinion, a premise owner can never be held liable unless it tests the air.

## II. THE STANDARD OF REVIEW APPLIED BY THE COURT OF APPEALS CONFLICTS WITH DECISIONS OF THIS COURT AND OTHER COURTS OF APPEALS' DECISIONS.

The Fifth Circuit's opinion conflicts with decisions of this Court and other circuits on the important questions of federal law as to the standard of review. Review by this Court is therefore warranted. The court of appeals stated that the standard of review was that of abuse of discretion. However, the court failed to articulate the scope and contents of the review it was conducting. The court failed to consider the particulars of respondents' motion and the deposition testimony submitted on that motion and it failed to consider the particulars of the district court's justifications for its ruling on that motion. The court in fact failed to apply an abuse of discretion standard. The court in fact conducted a plenary review for the purpose of justifying the exclusion. The court in fact acted in a prohibited role as a "super-expert" intended "to scrutinize experts in such a way as to exclude all but the perfect expert testimony" and it sanctioned a similar role by the district court. The court based a part of its opinion on evidence not in the record, it make findings of fact de novo, it made findings of fact contrary to the stipulated facts and contrary to the facts stated by both parties in their appellate briefs, it sua sponte raised and decided issues not argued by the parties, and it made erroneous pronouncements of the law. While the difference in the facts stated in the dissent as contrasted to that stated in the majority opinion resulted in part from a different view of the applicable law, it principally resulted from the fact that the dissent conducted a proper abuse of discretion review and the majority did not. The dissent stood in the shoes of the district court in its review, it read the motion, it read Dr. Jenkins' deposition testimony (submitted by Ashland on the motion) and the other evidence submitted on that motion and it read the district court's ruling. The majority totally ignored the particulars of the motion, ignored Dr. Jenkins' deposition testimony and focused on selective trial testimony given after the district court's in limine ruling.

In essence, the court of appeals' result-oriented holding was that *if* Ashland had presented a differently stated motion, and had properly cross-examined Dr. Jenkins as to the basis for his opinion, and presented proper rebuttal evidence, Dr. Jenkins' opinion could have been shown to lack adequate support to establish causation. The court of appeals did not take the record as it existed before the district court, rather it created a hypothetical record based on what the motion could have said and what it thought could have been developed and ruled on that basis. It also did not take the district court's ruling as it was stated, but created a hypothetical ruling based on what that court could have said based on the hypothetical facts.

The proponent of the expert evidence must establish by a preponderance of the evidence that the conditions for admissibility are satisfied. *See Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 592 n.10 (1993); *Bourjaily v. United States*, 483 U.S. 171, 175 (1987). This Court held in *General Electric Co. v. Joiner*, 118 S. Ct. 512, 517 (1997), that abuse of discretion is the proper standard of review of a district court's ruling excluding expert testimony. "However, such discretionary choices are not left to a court's inclination, but to its judgment; and its judgment is to be guided by sound legal principles."

*Albermarle Paper Co. v. Moody*, 422 U.S. 413, 416 (1975). Discretionary choices "hardly means that it is unfettered by meaningful standards or shielded from thorough appellate review." *Id.* This Court in *Joiner* stated that "the appellate court will not reverse in such a case, unless the ruling is manifestly erroneous." 118 S. Ct. at 517. It is uniformly recognized that:

> The abuse of discretion standard has also been described as requiring a showing that no reasonable person would have agreed with the lower court's ruling or as resulting because the trial court based its decisions on an erroneous view of the law or on a clearly erroneous assessment of the facts.

4 J. McLaughlin, J. Weinstein & M. Berger, *Weinstein's Federal Evidence* § 702.02[2], at 702-7 to 702-8 (1998). *See* 19 J. Moore, *Moore's Federal Practice* § 206.05[1], at 206-29 (1998). Stated another way:

> Abuse of discretion can occur in three principal ways: when a relevant factor that should have been given significant weight is not considered; when an irrelevant or improper factor is considered and given significant weight; and when all proper factors, and no improper ones, are considered, but the court, in weighing those factors, commits clear error of judgment.

*Richards v. Aramark Services, Inc.*, 108 F.3d 925, 927 (8th Cir. 1997). *See Pierce v. Underwood*, 487 U.S. 560, 574 (1988). *See* Childress, *A Standard of Review Primer*, 125 F.R.D. 319, 337 (1988).

The first principle of an abuse of discretion review is that the court of appeals stands in the district court's shoes. "It is important that the reviewing court evaluate the trial court's decision from its perspective when it had to rule and not indulge in review by hindsight." *Old Chief v. United States*, 117 S. Ct. 644, 651n.6 (1997). The appellate court is prohibited from deciding factual issues de novo. *Anderson v. City of Bessemer City, N.C.*, 470 U.S. 562, 573 (1985). Therefore, the court of appeals must consider the particulars of the district court's ruling and the particulars of the motion before that court that resulted in that ruling and any evidence offered by the parties in support of their positions prior to the ruling. Anything more, is a de novo review. *See, e.g.*, *Sementilli v. Trinidad Corp.*, 155 F.3d 1130, 1133-34 (9th Cir. 1998), in which the court of appeals held that the district court abused its discretion in excluding expert testimony by considering each of the reasons given by that court for the exclusion and discrediting each reason.

The second principle of an abuse of discretion review is that the court of appeals reviews the particulars of the district court's holding, or lack thereof, in terms of the applicable law. Where the controlling rule or Supreme Court decisions provides for criteria to be considered or applied, those criteria must be considered or applied by the district court and the district court must state substantial justification for its determination. *See, e.g., Cooter & Gill v. Hartmarx Corp.*, 496 U.S. 384, 405 (1990). *See* Friendly, *Indiscretion About Discretion*, 31 Emory L.J. 747, 770-71 (1982); Rosenberg, *Judicial Discretion of the Trial Court, Viewed From Above*, 22 Syracuse L. Rev. 635, 666 (1971). The focus of the review is the district court's stated justifications for its ruling, the particulars of the motion and the evidence submitted on the motion. *See, e.g., Pierce v. Underwood*, 487 U.S. 552, 558-59 (1988). In *General Electric Co. v. Joiner*, 118 S. Ct. 512, 518-19 (1997), this Court reviewed the opinion of the district court — eight pages of that opinion stated that court's justifications for the exclusion of the expert witnesses. (864 F. Supp. 1310, 1319-27). This Court reviewed what the district court said and *not* what it could have said. As to the one issue on which the district court said nothing, this Court remanded the case for a determination on that issue. 118 S. Ct. at 519. It did not — as the court of appeals below — hold that the district court's holding could have been based on facts that could have been developed and on aspects of the law unconsidered by that court.

The majority in fact failed to conduct an abuse of discretion review. Nowhere in its opinion does the majority state the justifications stated by the district court for its ruling. Nowhere in that opinion does the majority state the grounds for Ashland's motion or discuss Dr. Jenkins' deposition testimony and other evidence submitted on that motion. It repeatedly uses such phrases as "the district court was entitled to find or conclude", A. 19a, 21a, in a hypothetical sense as the district court made no such findings and stated no such conclusions. The district court failed to follow the law to focus its reliability inquiry on the expert's discipline. It failed to apply the proper criteria for that determination and in fact applied improper criteria. The court of appeals failed to review that determination. In fact, the majority not only wrote the district court's opinion for it — what it should have said when it made its determination, it also wrote Ashland's motion for it — what grounds it should have stated in that motion. The focus of the motion was Dr. Jenkins' deposition testimony which the majority ignored.

There is further proof that the court of appeals conducted a one-sided plenary review intended to justify the exclusion and made prohibited findings of fact de novo to support the exclusion. The court of appeals' opinion stated that: "The Brooks study relied upon by Dr. Jenkins suffered from the same self-doubts as the studies in *Joiner*." A. __. Further, that: "Dr. Brooks was unable to reach any conclusions based on his isolated studies." A. 16a n.8. And further stated that: "With respect to the Brooks article, item 3 above, the authors made it clear that their conclusions were speculative because of the limitations of the study." A. 18a. Dr. Brooks' article, *Reactive Airways Dysfunction Syndrome (RADS)*, 88 Chest 376 (1985), is not in the record. Before the district court it was testified to by Moore's two clinical medical doctors — Dr. Jenkins and Dr. Alvarez — and by Ashland's clinical medical doctor, Dr. Jones. None of them testified that Dr. Brooks was unable to reach any conclusions. None of them testified that his conclusions were speculative. In fact, Ashland in its briefing before the Court of Appeals never argued that Dr. Brooks article was speculative or that Dr. Brooks was unable to reach conclusions. By judicial admission of the parties there was never any dispute that RADS was a medically recognized disease and that this article by Dr. Brooks was authoritative and its conclusions were not speculative. The only source for the court of appeals' statements is an amicus brief filed by the Chamber of Commerce, which erroneously stated that "their conclusions about RADS is only speculative and not substantiated" by taking a sentence out of context and misstating it. Dr. Brooks' article concluded that RADS is a well-documented disease. Many subsequent studies have confirmed Dr. Brooks' findings and conclusions. Since the three clinical physicians who testified at trial were never asked about the sentence raised by the amicus brief, its meaning was not developed at trial. The majority became the "super-expert" and made prohibited de novo findings of fact and based a significant part of its opinion on erroneous statements. Moore had no opportunity to challenge this misstatement by offering the subsequent studies on RADS that have confirmed Dr. Brooks' work. Since at trial Ashland's expert, Dr. Jones, confirmed Dr. Brooks' work, there was no reason for Moore to do so in the district court.

As the panel opinion held, Dr. Jenkins' causation testimony was improperly excluded and that exclusion affected Moore's substantial rights. As the panel opinion held in remanding the case for a new trial, the exclusion likely influenced the jury.

## CONCLUSION

For the reasons stated, certiorari should be granted.

Respectfully submitted,

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# APPENDIX

# APPENDIX A — EN BANC OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT DATED AUGUST 14, 1998

**Bob T. MOORE; Susan Moore,**
**Plaintiffs-Appellants**
**Cross-Appellees,**

v.

**ASHLAND CHEMICAL INC.; Ashland**
**Oil Inc., Defendants-Appellees**
**Cross-Appellants,**

**and**

**Dow Corning Corporation; Cdc**
**Services, Inc., Defendants.**

**No. 95-20492.**

United States Court of Appeals,
Fifth Circuit.

Aug. 14, 1998.

* * *

Before KING, JOLLY, HIGGINBOTHAM, DAVIS, JONES, SMITH, DUHÉ, WIENER, BARKSDALE, EMILIO M. GARZA, DeMOSS, STEWART, BENAVIDES, PARKER and DENNIS, Circuit Judges.

W. EUGENE DAVIS, Circuit Judge:

## *Appendix A*

In this toxic tort case, we consider whether the district court abused its discretion in excluding the opinion of a physician on the causal relationship between Plaintiff's exposure to industrial chemicals and his pulmonary illness. We find no abuse of discretion and affirm.

### I.

Bob T. Moore was employed as a delivery truck driver for Consolidated Freightways, Inc. ("Consolidated"), a motor freight company. On the morning of April 23, 1990, Moore delivered several drums of chemicals manufactured by Dow Corning Corp. ("Dow") to Ashland Chemical Inc.'s ("Ashland") terminal in Houston. When Moore opened the back door of his trailer, he smelled a chemical odor that caused him to suspect that a drum was leaking. Moore and the Ashland plant manager, Bart Graves, identified two leaking drums and removed them from the trailer. Mr. Graves contacted Dow and requested cleanup instructions and a copy of the material safety data sheet ("MSDS") for the spilled chemicals. The MSDS identified the contents of the leaking drum and health hazards associated with the contents.[1] The MSDS stated that the chemical solution included hazardous ingredients, most notably Toluene. It warned that depending upon the level and duration of the exposure to fumes from the chemicals, irritation or injury to various organs, including the lungs, could result.

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[1] The MSDS provided, in part, as follows:

> MATL NAME: DOW CORNING(R) 1-2531 RELEASE COATING
>
> . . . .
>
> SECTION II — HAZARDOUS INGREDIENTS AS DEFINED IN 29 CFR 1910.1200 . . .
>
> TOLUENE . . .

(Cont'd)

After Moore and Graves obtained cleanup instructions, they put the leaking drums into larger salvage drums. Moore and another Consolidated employee then proceeded to place

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(Cont'd)

> SOLVENT NAPHTHA, PETROLEUM, LIGHT ALIPHATIC . . .
>
> ISOBUTYLISOBUTYRATE
>
> PROPYLENE GLYCOL METHYL ETHER . . .
>
> SECTION III — EFFECTS OF OVEREXPOSURE
>
> . . .
>
> INHALATION: SHORT VAPOR EXPOSURE MAY CAUSE DROWSINESS AND IRRITATE NOSE AND THROAT. VAPORS MAY INJURE BLOOD, LIVER, LUNGS, KIDNEYS, AND NERVOUS SYSTEM. DEGREE OF EFFECTS DEPENDS ON CONCENTRATION AND LENGTH OF EXPOSURE.
>
> . . .
>
> COMMENTS. PROLONGED TOLUENE OVEREXPOSURE MAY INJURE BLOOD, LIVER, LUNGS, KIDNEYS, AND NERVOUS SYSTEM AND MAY AGGRAVATE EXISTING EYE, SKIN, AND RESPIRATORY DISORDERS.

absorbent material on the spilled chemicals, sweep them up, and dispose of them. The men were engaged in this cleanup for forty-five minutes to an hour. After the cleanup, Moore returned to the Consolidated terminal. At trial, he testified that about an hour after finishing the cleanup, he began experiencing symptoms, including dizziness, watery eyes, and difficulty in breathing. However, Moore was able to drop off another Consolidated trailer as requested by his supervisor.

When he completed this delivery, Moore returned to Consolidated's terminal and told his supervisor that he was sick. The supervisor sent Moore to the company doctor. The next day, Moore saw his family physician. After two to three weeks of treatment by the family physician, Moore placed himself under the care of a Dr. Simi, a pulmonary specialist. Dr. Simi released Moore to return to work on the 11th day of June, 1990. After working several days, Moore terminated his employment due to difficulty breathing. On three occasions in the summer of 1990, Moore also consulted Dr. Daniel E. Jenkins, a pulmonary specialist. Dr. Jenkins diagnosed Moore's condition as reactive airways dysfunction syndrome ("RADS"), an asthmatic-type condition. In November of 1990, Moore consulted another pulmonary specialist, Dr. B. Antonio Alvarez, who became his primary treating physician. Dr. Alvarez confirmed Dr. Jenkins's diagnosis and treated Moore for RADS.

Moore reported to his physicians that he had smoked approximately a pack of cigarettes a day for approximately twenty years, and he continued to smoke at the time of trial. He also reported that on April 23, 1990, when he was exposed to the Dow chemical, he had just returned to work following a bout with pneumonia. Moore also related a history of childhood asthma to his treating physician.

Moore and his wife filed suit against Ashland Chemical, Inc., Ashland Oil, Inc., and others, primarily on grounds that Ashland was negligent in insisting that Moore expose himself to vapors created by the chemical spill. More specifically, Moore complained that Ashland's employee, Bart Graves, should have permitted Moore to return to Consolidated's terminal where other employees could have cleaned up the spill. He also complained that Graves did not permit him to use a respirator during the cleanup. Ashland removed the suit to federal court on the basis of diversity jurisdiction.

After extensive discovery and motion practice dealing particularly with whether Moore's expert physicians, Dr. Jenkins and Dr. Alvarez, would be permitted to testify, the case proceeded to trial before a jury. At the conclusion of the trial, the jury answered the following interrogatory in the negative: "Do you find, from a preponderance of the evidence, that the negligence, if any, of the person named below proximately caused the injury in question: . . . (b) Ashland Chemical, Inc. and/or Ashland Oil, Inc." Thereafter, the district court entered a take nothing judgment against Moore. On appeal, a divided panel of this Court concluded that the district court had erred in refusing to allow Dr. Jenkins, one of Moore's experts, to give an opinion on the cause of Moore's illness, and reversed the district court's judgment and remanded the case for a new trial. *Moore v. Ashland Chem., Inc.*, 126 F.3d 679 (5th Cir.1997). We granted rehearing to consider this case en banc and to clarify the standards district courts should apply in determining whether to admit expert testimony.

## II.

In this appeal we focus on the trial court's refusal to permit one of Moore's medical witnesses, Dr. Daniel E. Jenkins, to give an opinion on the cause of Moore's illness. Some factual and procedural background is necessary to understand the arguments of the parties.

Moore sought to call two medical witnesses, Dr. Jenkins and Dr. Antonio Alvarez. Dr. Jenkins, a well-qualified medical specialist, was certified by the American Board of Internal Medicine in 1947. He also had special training and taught in the fields of pulmonary disease, allergy, and environmental medicine.[2] Dr. Jenkins saw Moore on three occasions. He examined Moore, performed a series of tests, and reviewed Moore's medical records. He concluded that Moore was suffering from RADS. Based upon his examination and tests, Dr. Jenkins expressed the opinion that Moore's RADS had been caused by Moore's exposure to vapors from the chemical spill at Ashland's facility in April of 1990. We will discuss later in more detail the reasons Dr. Jenkins assigned for his opinion. Generally, he relied upon the MSDS, which warned that exposure to the Toluene solution could be harmful to the lungs, his examination and test results, and the close, temporal connection between Moore's exposure to the Toluene solution and the onset of symptoms.

Dr. Alvarez, who was a former student of Dr. Jenkins, agreed with Dr. Jenkins about the cause of Moore's RADS. Dr.

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[2] The Defendants agree that Dr. Jenkins's qualifications are outstanding. He served residencies in internal medicine, tuberculosis, and chest disease and allergy, and was certified by the American Board of Internal Medicine in 1947. After serving as Chief Resident in Medicine and Assistant Professor of Medicine and Physician in Charge of the Tuberculosis and Chest Unit at the University of Michigan Medical School from 1943 to 1947, he spent forty-four years on the faculty at Baylor Medical School. In 1991, he went into practice in Houston with a group of physicians specializing in respiratory ailments.

Alvarez was Moore's primary treating physician. In addition to the reasons relied on by Dr. Jenkins, Dr. Alvarez supported his theory of causation with a report of a study on RADS co-authored by Dr. Stuart Brooks that he found in a medical magazine.[3] One case study in the report involved a clerk who was exposed to a Toluene mixture in a small, enclosed room for two and one-half hours. Dr. Jenkins initially stated in his deposition that he knew of no reported literature that supported his causation opinion. During his *in limine* testimony outside the presence of the jury at trial, Dr. Jenkins, for the first time, pointed to the Brooks study relied on by Dr. Alvarez.

Dr. Jenkins admitted that Moore was his first RADS patient with a history of exposure to Toluene. He had conducted no research on this subject. Dr. Jenkins had previously treated other patients whose RADS he attributed to exposure to chemicals that were known to irritate the airways. However, he conceded that the chemicals involved with these previous patients were stronger and more irritating than the Toluene solution to which Moore was exposed. Dr. Jenkins made no attempt to explain how any of the other chemicals that he believed caused RADS in his earlier patients had properties similar to the Dow Toluene solution.

The district court, after reviewing Dr. Jenkins's deposition and listening to his *in limine* testimony, decided to exclude his causation opinion. The court did permit Dr. Jenkins to testify about his examination of Moore, the tests he conducted, and the diagnosis he reached. The only feature of Dr. Jenkins's testimony the court excluded was his opinion that the Toluene solution caused Moore's RADS. The district court concluded that Dr. Jenkins had no scientific basis for this opinion, that it was not sufficiently reliable under Fed.R.Evid. 702, and that it would be inconsistent with the court's gatekeeper role under *Daubert* to admit this opinion.

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[3] Stuart M. Brooks, M.D. et al., *Reactive Airways Dysfunction Syndrome (RADS)*, 88 CHEST 376 (1985).

The district court decided to admit Dr. Alvarez's causation opinion even though it was essentially identical to Dr. Jenkins's proffered opinion. The district court was apparently convinced that Dr. Alvarez's opinion linking the RADS to Moore's exposure to the Toluene solution was more reliable than Dr. Jenkins's opinion because Dr. Alvarez had been the treating physician, and also because he had relied from the outset on the Brooks study and therefore had some support from the scientific literature for his conclusion. In view of the verdict, the Defendants do not challenge the district court's decision to admit Dr. Alvarez's opinion. Thus, the propriety of this ruling is not presented to us for review.

The single defense expert, Dr. Robert Jones, was the third medical witness to testify. Based upon his review of the medical records, Dr. Jones concluded that Moore did not have RADS; rather, according to Dr. Jones, Moore suffered from a form of bronchial asthma. Dr. Jones further testified that the evidence in the case was insufficient to allow him to conclude that Moore's exposure to Toluene caused his pulmonary problems. Dr. Jones's conclusion was reinforced by Moore's medical history, which included conditions that Dr. Jones thought were much more likely triggering agents for RADS. These conditions included Moore's history as a heavy smoker for approximately twenty years, his history of asthma, and his recent bout with pneumonia. Dr. Jones also testified that the scientific literature revealed that Toluene and similar substances have a low potential for causing lung injury except when encountered in such high dosages that the person is overcome and passes out.

With this background, we now turn to the issue presented by this appeal: whether the district court erred in excluding Dr. Jenkins's causation testimony.

## III.

### A.

Fortunately, the Supreme Court recently resolved a disagreement among the circuits about the standard for reviewing a district court's admission or exclusion of expert testimony. In *General Electric Co. v. Joiner*, 522 U.S. 136, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997), the Court held that we should review such decisions for an abuse of discretion. In evaluating whether the district court abused its discretion in excluding Dr. Jenkins's testimony on causation, the Supreme Court's decisions in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), and *Joiner* control our analysis.

In *Daubert*, the lower courts considered the admissibility of expert testimony on medical causation. The expert witnesses sought to testify that ingestion of Bendectin, a prescription anti-nausea drug, by several mothers caused birth defects in their children. The lower courts excluded the evidence on the basis that the experts' methodology was not generally accepted in the scientific community and had not been subjected to peer review. The Supreme Court, speaking through Justice Blackmun, first concluded that the "*Frye* doctrine,"[4] requiring that a theory be generally accepted in the scientific community before it can be the basis of an expert's opinion, was not a controlling principle in federal trials. *Daubert*, 509 U.S. at 589, 113 S.Ct. at 2794. Justice Blackmun then turned to Rule 702 of the Federal Rules of Evidence[5] and the proper test for admissibility of scientific evidence.

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[4] *Frye v. United States*, 293 F. 1013 (D.C.Cir.1923).

> That the *Frye* test was displaced by the Rules of Evidence does not mean, however, that the Rules themselves place no limits on the admissibility of purportedly scientific evidence. Nor is the trial judge disabled from screening such evidence. To the contrary, under the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.
>
> The primary locus of this obligation is Rule 702, which clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify. "*If scientific*, technical, or other specialized *knowledge will assist the trier of fact* to understand the evidence or to determine a fact in issue" an expert "may testify *thereto*." The subject of an expert's testimony must be "scientific . . . knowledge." The adjective "scientific" implies a grounding in the methods and procedures of

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[5] Fed.R.Evid. 702 provides:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

> science. Similarly, the word "knowledge" connotes more than subjective belief or unsupported speculation. The term "applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds." Webster's Third New International Dictionary 1252 (1986). Of course, it would be unreasonable to conclude that the subject of scientific testimony must be "known" to a certainty; arguably, there are no certainties in science. But, in order to qualify as "scientific knowledge," an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation — i.e., "good grounds," based on what is known. In short, the requirement that an expert's testimony pertain to "scientific knowledge" establishes a standard of evidentiary reliability.

*Daubert*, 509 U.S. at 589-90, 113 S.Ct. at 2794-95 (emphasis in original) (internal citations omitted).

The Court stated further that:

> Rule 702 further requires that the evidence or testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." This condition goes primarily to relevance. "Expert testimony which does not relate to any issue in the case is not relevant and, ergo, non-helpful."

*Id.* at 591, 113 S.Ct. at 2795 (citation omitted). The Court then proceeded to enumerate a five-factor, non-exclusive, flexible test for district courts to consider when assessing whether the methodology is scientifically valid or reliable. These factors include: (1) whether the expert's theory can be or has been tested; (2) whether the theory has been subject to peer review and publication; (3) the known or potential rate of error of a technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) the degree to which the technique or theory has been generally accepted in the scientific community. *Id.* at 593-95, 113 S.Ct. at 2796-97.[6]

The Supreme Court concluded by pointing out that important differences exist between truthseeking in the courtroom and in the laboratory:

> Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve

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[6] The panel majority took the position that because Dr. Jenkins's causation opinion was not predicated on "hard science," it was therefore not subject to *Daubert*'s standards for admissibility. We disagree. *Daubert* and *Joiner* both involved questions of medical causation. As one of the scientists who filed an amicus brief, Professor Alvan R. Feinstein, stated: "In other words, determining the etiology of a disease — its cause — involves the same scientific exercise, whether the decision is made by a clinician, an epidemiologist, or other scientist." Brief of Dr. Feinstein, Sterling Professor of Medicine and Epidemiology at the Yale University School of Medicine and author and co-author of more than 375 peer-reviewed articles and five scientific texts, including *Clinical Judgment*.

In any event, in this Circuit an opinion is governed by Fed.R.Evid. 702 and *Daubert*, even though the opinion is not grounded in "hard science," assuming such a distinction exists. In *Watkins v. Telsmith, Inc.*, 121 F.3d 984 (5th Cir.1997), we rejected the position that application of the *Daubert* factors is unwarranted in cases where expert testimony is based solely on experience or training. *Id.* at 988-90.

> disputes finally and quickly. The scientific project is advanced by broad and wide-ranging consideration of a multitude of hypotheses, for those that are incorrect will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final and binding legal judgment — often of great consequence — about a particular set of events in the past. We recognize that, in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will prevent the jury from learning of authentic insights and innovations.

*Daubert*, 509 U.S. at 597, 113 S.Ct. at 2798-99. The Court remanded the case to permit the lower courts to evaluate their rulings in light of the multi-factor, flexible test it had just announced.

Procedurally, *Daubert* instructs us that the district court must determine admissibility under Rule 702 by following the directions provided in Rule 104(a).[7] Rule 104(a) requires the judge to conduct preliminary fact-finding and to make a "preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue." *Daubert*, 509 U.S. at 592-93, 113 S.Ct. at 2796.

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[7] Fed.R.Evid. 104(a) provides:

> Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b).

Thus, the party seeking to have the district court admit expert testimony must demonstrate that the expert's findings and conclusions are based on the scientific method, and, therefore, are reliable. This requires some objective, independent validation of the expert's methodology. The expert's assurances that he has utilized generally accepted scientific methodology is insufficient. *See Daubert v. Merrell-Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1316 (9th Cir.1995) (on remand). The proponent need not prove to the judge that the expert's testimony is correct, but she must prove by a preponderance of the evidence that the testimony is reliable. *See In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717 (3d Cir.1994); *see also* 2 STEPHEN A. SALTZBURG ET AL., FEDERAL RULES OF EVIDENCE MANUAL 1229-40 (7th ed.1998).

In sum, the law cannot wait for future scientific investigation and research. We must resolve cases in our courts on the basis of scientific knowledge that is currently available. The inquiry authorized by Rule 702 is a flexible one; however, a scientific opinion, to have evidentiary relevance and reliability, must be based on scientifically valid principles.

Last term, in *General Electric Co. v. Joiner*, __ U.S. __, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997), the Supreme Court gave us helpful insight into the application of the *Daubert* principles. In *Joiner*, the plaintiff sued, claiming that his small-cell lung cancer was caused by his exposure to polychlorinated biphenyls ("PCBs") in the workplace. The plaintiff offered expert testimony to establish his causation theory. The district court ruled that the testimony was scientifically unreliable and refused to admit the proffered evidence. The Eleventh Circuit Court of Appeals reversed and held that the simple abuse of discretion standard of review did not apply to the ruling; rather, "a particularly stringent standard of review" applied "to the trial judge's exclusion of expert testimony" that resulted in the dismissal of the suit. *Joiner v. General Elec. Co.*, 78 F.3d 524, 529 (11th Cir.1996). The Supreme Court reversed, holding that the usual abuse of discretion standard generally applied to evidentiary rulings also applied to the admission or exclusion of expert testimony. *General Elec. Co. v. Joiner*, __ U.S. __, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997). The Supreme Court's treatment of several of Joiner's arguments is instructive to both trial courts and courts of appeals in the area of admissibility of expert testimony.

The Court emphasized that a district court, while acting as a gatekeeper for expert evidence, must evaluate whether there is an adequate "fit" between the data and the opinion proffered. *Joiner*, 118 S.Ct. at 519. One of the bases for the experts' causation opinion in *Joiner* was animal studies on the effects on rats injected with large doses of PCBs. In analyzing Joiner's argument, the Court observed that

> [r]ather than explaining how and why the experts could have extrapolated their opinions from these seemingly far-removed animal studies, respondent chose to proceed as if the only issue [was] whether animal studies can ever be a proper foundation for an expert's opinion. Of course, whether animal studies can ever be a proper foundation for an expert's opinion was not the issue. The issue was whether these experts' opinions were sufficiently supported by the animal studies on which they purported to rely. The studies were so dissimilar to the facts presented in this litigation that it was not

> an abuse of discretion for the District Court [sic] to have rejected the experts' reliance on them.

*Id.* at 518 (internal quotation and citation omitted).

The Court next considered four published epidemiological studies on which the proffered experts relied to determine whether they provided a sufficient basis for the experts' opinion. The Court observed that the authors of the first two studies, while finding that the rate of cancer deaths among former employees at plants where workers were exposed to PCBs was higher than might have been expected, nevertheless concluded that "there were apparently no grounds for associating lung cancer deaths (although increased above expectations) and exposure in the plant." *Joiner*, 118 S.Ct. at 518 (citation omitted). The Court concluded that given that the authors of the article were "unwilling to say that PCB exposure had caused cancer among the workers they examined, their study did not support the experts' conclusion that Joiner's exposure to PCBs caused his cancer." *Id.* at 518.[8] The Court next referred to the two remaining studies, one of which made no mention of PCBs and the other in which the PCB-exposed group had also been subjected to additional potential carcinogens. The Court observed that the district court was entitled to conclude that these studies were likewise no help to the experts in supporting their opinions. *Id.* at 519.

The Court concluded its discussion of Joiner's arguments as follows:

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[8] This analysis by the Supreme Court is particularly relevant to our case. The Brooks study relied upon by Dr. Jenkins suffered from the same self-doubts as the studies in *Joiner*. Dr. Brooks was unable to reach any conclusions based on his isolated studies.

> Respondent points to *Daubert*'s language that the "focus, of course, must be solely on principles and methodology, not on the conclusions that they generate." He claims that because the District Court's disagreement was with the conclusion that the experts drew from the studies, the District Court committed legal error and was properly reversed by the Court of Appeals. But conclusions and methodology are not entirely distinct from one another. Trained experts commonly extrapolate from existing data. But nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered. That is what the District Court did here, and we hold that it did not abuse its discretion in so doing.

*Joiner*, 118 S.Ct. at 519 (internal citations omitted).

### B.

With this background, we turn to the record evidence in this case to apply the Supreme Court's directives in *Daubert* and *Joiner*, and to determine whether the district court abused its discretion in excluding Dr. Jenkins's testimony.

Dr. Jenkins pointed to the following support for his causation conclusion: (1) the MSDS from Dow warned that exposure to fumes from the Toluene solution could cause injury to the lungs; (2) Moore had an onset of symptoms shortly after his exposure to the Toluene solution; (3) although Dr. Jenkins did not initially rely on the Brooks article, when it was called to his attention at trial by counsel, he did claim to have knowledge of the article and stated that he had relied on it; (4) his training and experience; and (5) his examination and test results.

The district court was entitled to conclude that the above bases for Dr. Jenkins's opinion were individually and collectively inadequate under *Daubert*. First, Dr. Jenkins's training and experience and his examination and tests, items 4 and 5 above, were obviously important to his diagnosis. However, Dr. Jenkins gave no reason why these items were helpful in reaching his conclusion on causation. He admitted that he had never previously treated a patient who had been exposed to a similar Toluene solution. Dr. Jenkins was a highly qualified pulmonary specialist, but, as the Seventh Circuit observed in *Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316 (7th Cir.1996), "[u]nder the regime of *Daubert* a district judge asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist." *Id.* at 318 (internal citation omitted).

With respect to the Brooks article, item 3 above, the authors made it clear that their conclusions were speculative because of the limitations of the study. Also, in the single study involving exposure to Toluene fumes, the level and duration of the exposure was several times greater than Moore's exposure.

The bases for Dr. Jenkins's causation opinion are therefore reduced to the following: (1) the Dow MSDS from which Dr. Jenkins could have gleaned that the contents of the drum were irritating to the lungs at some level of exposure; and (2) the relatively short time between Moore's exposure to the chemicals and the onset of his breathing difficulty.

The district court was entitled to find that the Dow MSDS had limited value to Dr. Jenkins. First, Dr. Jenkins admitted that he did not know what tests Dow had conducted in generating the MSDS. Second, and perhaps more importantly, Dr. Jenkins had no information on the level of exposure necessary for a person to sustain the injuries about which the MSDS warned. The MSDS made it clear that the effects of exposure to Toluene depended on the concentration and length of exposure.

The district court was also correct in viewing with skepticism Dr. Jenkins's reliance on the temporal proximity between the exposure and injury. *Cavallo v. Star Enter.*, 892 F.Supp. 756 (E.D.Va.1995), *aff'd. in part*, 100 F.3d 1150 (4th Cir.1996), contains a helpful discussion of this issue. In that case, the plaintiff alleged that she suffered respiratory illness as a result of exposure to aviation jet fuel vapors. The proffered expert relied substantially on the temporal proximity between exposure and symptoms. The court concluded that this reliance was "not supported by appropriate validation" as required by *Daubert*, and was "ultimately unreliable." 892 F.Supp. at 773. The court observed that although "there may be instances where the temporal connection between exposure to a given chemical and subsequent injury is so compelling as to dispense with the need for reliance on standard methods of toxicology," this was not such a case. *Id.* at 773-74. The court pointed out that the plaintiff in *Cavallo* was not doused with jet fuel and that there was no mass exposure of jet fuel to many people who in turn suffered similar symptoms. In the absence of an established scientific connection between exposure and illness, or compelling circumstances such as those discussed in *Cavallo*, the temporal connection between exposure to chemicals and an onset of symptoms, standing alone, is entitled to little weight in determining causation.[9]

Dr. Jenkins offered no scientific support for his general theory that exposure to Toluene solution at any level would cause RADS. Because he had no accurate information on the level of Moore's exposure to the fumes, Dr. Jenkins necessarily had no support for the theory that the level of chemicals to which Moore was exposed caused RADS.[10] Dr. Jenkins made no attempt to explain his conclusion by asserting that the Toluene solution had properties similar to another chemical exposure to which RADS had been scientifically linked. Several post-*Daubert* cases have cautioned about leaping from an accepted scientific premise to an unsupported one. *See Wheat v. Pfizer, Inc.*, 31 F.3d 340, 343 (5th Cir.1994); *see also Braun v. Lorillard Inc.*, 84 F.3d 230, 235 (7th Cir.1996); *Daubert*, 43 F.3d at 1319; *Cavallo*, 892 F.Supp. at 769. To support a conclusion based on such reasoning, the extrapolation or leap from one chemical to another must be reasonable and scientifically valid. *See Daubert*, 43 F.3d at 1319-20; *Cavallo*, 892 F.Supp. at 769.

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[9] *See also Porter v. Whitehall Labs., Inc.*, 9 F.3d 607 (7th Cir.1993); 2 STEPHEN A. SALTZBURG ET AL., FEDERAL RULES OF EVIDENCE MANUAL 1233-34 (7th ed.1998).

[10] Given the paucity of facts Dr. Jenkins had available about the level of Moore's exposure to the Toluene solution, his causation opinion would have been suspect even if he had scientific support for the position that the Toluene solution could cause RADS in a worker exposed to some minor level of the solution. Under *Daubert*, "*any* step that renders the analysis unreliable . . . *renders the expert's testimony inadmissible. This is true whether the step completely changes a reliable methodology or merely misapplies that methodology.*" *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 745 (3d Cir.1994) (emphasis in original).

In the end, Dr. Jenkins was relegated to his fall-back position that *any* irritant to the lungs could cause RADS in a susceptible patient. Dr. Jenkins cited no scientific support for this theory. None of *Daubert*'s factors to assess whether the opinion was based on sound scientific principles was met. Dr. Jenkins's theory had not been tested; the theory had not been subjected to peer review or publication; the potential rate of error had not been determined or applied; and the theory had not been generally accepted in the scientific community. In sum, Dr. Jenkins could cite no scientific support for his conclusion that exposure to any irritant at unknown levels triggers this asthmatic-type condition. Under the *Daubert* regime, trial courts are encouraged to exclude such speculative testimony as lacking any scientific validity.

The district court was also entitled to conclude that Moore's personal habits and medical history made Dr. Jenkins's theory even more unreliable. Moore had been a moderate to heavy smoker for twenty years. In addition, he had just recovered from pneumonia shortly before his contact with the chemicals. Finally, Moore had suffered from asthma (a condition very similar to RADS) in his youth.

In sum, the district court did not abuse its discretion in finding that the "analytical gap" between Dr. Jenkins's causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide. The district court was entitled to conclude that Dr. Jenkins's causation opinion was not based on scientific knowledge that would assist the trier of fact as required by Rule 702 of the Federal Rules of Evidence.

## CONCLUSION

*Daubert* and its progeny give the district court discretion to "keep the gate" for the purpose of admitting or excluding opinion testimony. In this case, the district court did not abuse that discretion in concluding that the causation evidence proffered by Dr. Jenkins should be excluded. It was within the judge's discretion to conclude that Dr. Jenkins's testimony was not grounded in science as required by *Daubert* and its progeny, and, therefore, was not sufficiently reliable for the jury to consider. We therefore affirm the judgment of the district court.

AFFIRMED.

KING, Circuit Judge, concurs in the result reached by the majority.

BENAVIDES, Circuit Judge, specially concurring:

Although I join both the reasoning and result of the majority opinion, I write separately to reiterate that, under *General Electric Co. v. Joiner*, __ U.S. __, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997), the issue before us is whether the magistrate judge abused her discretion in excluding the testimony of Dr. Jenkins. While I believe this case to be a close one, I must agree that the magistrate judge acted within her discretion in excluding Dr. Jenkins's proffered testimony. It does not follow from this, however, that she would have abused her discretion by admitting the proffered testimony. On the contrary, had she admitted the testimony, I would likewise be of the opinion that she acted within her discretion. I do not read the majority opinion to require otherwise.

DENNIS, Circuit Judge, with whom PARKER and STEWART, Circuit Judges, join, dissenting:

I respectfully dissent.

The majority *en banc* opinion (1) conflicts with the view of other circuits, a state court of last resort, and scholarly commentary, in holding that (a) a clinical medical expert cannot express an opinion as to a causal relationship between a chemical compound and a plaintiff's disease, although the opinion is based on the sound application of generally accepted clinical medical methodology, unless the causal link is confirmed by hard scientific methodology as per the *Daubert* factors[1], *see Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993); (b) the temporal relationship between chemical exposure and symptoms of disease are to be accorded little weight by courts in assessing an expert's determination of causation with either clinical medical or hard science methodology; (c) even when an expert has hard scientific support for a general causal relationship between a chemical compound and a particular disease, his opinion of a specific causal relationship between the compound and an individual's disease is "suspect" unless the expert also has scientifically accurate data as to the level of that person's exposure to the chemical compound; (2) conflicts with Supreme Court decisions by conducting a de novo trial of the preliminary assessment hearing on the record, substituting its own erroneous ruling and reasons for those of the district court, and disregards the district court's errors of law, clearly erroneous factual findings, and abuse of discretion.

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[1] Evidently, the majority interprets the final *Daubert* factor, "general acceptance," to mean acceptance within a relevant "hard scientific" community. For it is undisputed that the methods and techniques used by Dr. Daniel Jenkins to determine that Mr. Moore's RADS had been caused by his exposure to the chemical compound, i.e. history taking, physical examinations, differential etiology (conducting tests to eliminate other diagnoses and causes of the patient's disease), and review of other physicians' reports were generally accepted within the doctor's own clinical medical disciplines of pulmonary and environmental medicine.

### 1.

After *Daubert*, federal courts have become balkanized on important questions that confront federal trial judges daily, e.g., whether *Daubert* applies outside the field of hard science; if so, whether *Daubert*'s gatekeeping function applies to the admission of any or all of the other types of expert testimony; if so, whether application of the *Daubert* "factors" is required in the admission of any or all testimony based on knowledge not derived by hard scientific methodology. Even before the present *en banc* circuit opinion there was a clear and present need for the Supreme Court to clarify whether and, if so, how, *Daubert* applies to expert testimony based on knowledge derived by disciplines or sources other than the hard sciences. *E.g.*, 29 Charles A. Wright and Victor J. Gold, FEDERAL PRACTICE AND PROCEDURE § 6266 (1997); 2 Michael H. Graham, HANDBOOK OF FEDERAL EVIDENCE § 702.5, pp. 22-26 (Supp.1998).

### (a)

The majority opinion represents an eccentric additional fragmentation of the *Daubert* picture that underscores the need for Supreme Court guidance. This circuit now takes the position that a clinical medical expert, correctly using and applying generally accepted clinical medical methodology, may not express an opinion as to whether a particular chemical compound caused, aggravated, or contributed to a person's disease or disorder unless that opinion is corroborated by hard scientific methodology that passes muster under a rigid application of the *Daubert* factors.

The majority's rule applies even to single plaintiff negligence actions that do not involve substances alleged to cause diseases in large numbers of persons or diseases having long latency periods. The *en banc* majority opinion emanates from a case in which a single plaintiff claims to have developed a reactive airways disorder as a result of a defendant's negligence in causing him to clean up a spillage of a chemical compound without taking any safety precautions. The defendant refused to provide the plaintiff with a respirator or to measure the air contamination with a safety meter although the defendant had both devices ready at hand. The plaintiff was required to work in and around an enclosed 28-foot trailer for about an hour in cleaning up the spilled chemical compound.

Unlike many toxic torts situations, in Mr. Moore's case there was not a long latency period between the onset of symptoms and the chemical compound gases that were alleged to have caused his illness. The onset of the plaintiff's respiratory disease occurred less than an hour after his exposure during his clean up of the chemical compound. He immediately sought emergency medical treatment, which included being given oxygen, and he has been under treatment for his respiratory disease ever since. The particular circumstances of the plaintiff's inhalation injury, combined with the fact that so few humans have ever been subjected to a similar exposure to the chemical compound involved, obviously impacted on the manner in which the plaintiff could prove causation. The quantity of persons who sustain this type of exposure was simply too small for a plaintiff to be able to provide epidemiological, animal testing or other hard scientific evidence linking the particular chemical compound to reactive airways disease. *See Zuchowicz v. United States*, 140 F.3d 381, 385-86 (2nd Cir.1998)(described *infra.*).

Although the *en banc* majority recognizes that cases involving chemical compounds which have not been subjected to hard scientific testing must be timely resolved and cannot await the fortuity of relevant scientific experimentation, the majority nevertheless insists that every admissible medical causation opinion in a chemical injury case must have a hard science, Daubert factor related basis. If such hard scientific data is not available, the majority decrees, a plaintiff must face trial or the defendant's summary judgment motion without a medical causation expert witness.[2]

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[2] In *Daubert*, the Court stated:

> Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly. The scientific project is advanced by broad and wide-ranging consideration of a multitude of hypotheses, for those that are correct will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final and binding legal judgment — often of great consequence — about a particular set of events in the past. We recognize that, in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will

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> prevent the jury from learning of authentic insights and innovations. *Daubert*, 509 U.S. at 597, 113 S.Ct. 2786.

The majority *en banc* opinion quotes this passage at page 275-276 and proceeds to stand it on its head on page 276, interpreting the Supreme Court's words as supporting the majority's proposition that although hard scientific proof of medical causation will not always be available in chemical injury cases, the cases must be quickly resolved; therefore, in chemical injury cases, if the plaintiff can produce only clinical medical experts whose opinions are based solely on well accepted clinical medicine methodology, they must face trial without a medical causation expert witness.

The *Daubert* Court neither expressed nor implied such a draconian rule. Being confronted with a case involving the admissibility of hard science epidemiological expert opinions, not generally accepted in that field, proffered to prove that Bendectin could have caused birth defects in children whose mothers used the drug, the Court concluded that the evidence could not be excluded under the *Frye* rule which was superseded by the Federal Rules of Evidence, but that the trial judge as gatekeeper must determine that the hard science evidence proffered is not only relevant but also reliable as based on a sound application of the methodology of the expert's discipline and suggested several ways, based on basic elements of hard science methodology, that a party who proffers an expert who proposes to testify to a hard scientific opinion can show that the opinion is reliable or, reciprocally, that a court can use to test the opinion's reliability.

These ways of testing or showing reliability of hard scientific opinions have become known as the "*Daubert* factors." But the Court did not intend to require that these gauges of reliability be applied monolithically to all expert testimony. When the expert does not propose to testify to an opinion based on hard scientific methodology, the Court indicated that the reliability of his opinion should be assessed according

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The majority opinion creates a schism between this court and other circuits and a state court of last resort and disregards the teachings of federal evidence law scholars.

The Second, Fourth, and Third Circuits have held that a clinical physician may, consistently with *Daubert*, express an opinion, based on clinical medical methodology generally accepted within that discipline, that a particular toxic substance caused the patient's disease or death, without hard scientific corroboration under an inflexible application of the *Daubert* factors.

The Second Circuit in *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038 (2nd Cir.1995), rejected the defendant's argument for exclusion of a clinical physician's opinion, as scientifically unfounded, that glue fumes caused the plaintiff's respiratory symptoms and throat polyps. The doctor's opinion was based entirely upon his use of clinical medical methodology, without

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to the methodology of the expert's own discipline. The *Daubert* court did not indicate, and this court is not called upon to decide, what a trial court should do if it is confronted by proffers of experts who propose to testify to directly conflicting opinions as to medical causation, one based on hard scientific methodology and the other based on clinical medical methodology. In such a case, it is likely that the trial court should find the clinical medical expert's opinion unreliable if it fails to take into account and distinguish the hard scientific expert's opinion and its basis in hard scientific data, if the court finds the latter to be reliable. The *Daubert* Court did no suggest, however, that the Federal Rules of Evidence authorize a federal court to formulate a rule, as the *en banc* majority has done, that, in effect, bars a clinical physician from expressing an opinion as to the probable chemical causation of a disease in a specific individual until the existence of a general causal relationship has been confirmed by the use of hard scientific methodology.

any hard science or strict *Daubert* factor related basis. The doctor could not point to a single piece of medical literature that said that glue fumes cause throat polyps. In describing the doctor's use of clinical medical methodology as vouching for the reliability of his opinion, the court stated:

> [Dr.] Fagelson based his opinion on a range of factors, including his care and treatment of McCullock; her medical history (as she related it to him and as derived from a review of her medical and surgical reports); pathological studies; review of Fuller's MSDS; his training and experience; use of a scientific analysis known as differential etiology (which requires listing possible causes, then eliminating all causes but one); and reference to various scientific and medical treatises. Disputes as to the strength of his credentials, faults in his use of differential etiology as a methodology, or lack of textual authority for his opinion, go to the weight, not the admissibility, of his testimony. *Id.* at 1044.

In *Zuchowicz v. United States*, 140 F.3d 381 (2nd Cir.1998), the Second Circuit reaffirmed its holding in *McCullock*. The *Zuchowicz* court approved the admission of a pulmonary medical expert's opinion that a negligent overdose of Danocrine had been responsible for the pulmonary disease related death of the plaintiff's wife. The doctor based his opinion on the temporal relationship between the overdose and the start of the disease, the deceased's apparent good health prior to the overdose, and the differential etiology method of excluding other possible causes. *Id.* at 385. He also testified that Mrs. Zuchowicz's illness was similar in onset, timing and course of development to other cases of pulmonary diseases known to have been caused by other classes of drugs. *Id.* at 385-86. There had been no scientific tests to determine the effects of dosages at the level received by Mrs. Zuchowicz, and the doctor's opinion as to medical causation, based solely on clinical medical methodology, was not confirmed by any hard science or strict *Daubert* factor evidence. *See also Ambrosini v. Labarraque*, 101 F.3d 129, 138 (D.C.Cir.1996)(stating that the fact that a case may be the first of its type should not prevent a plaintiff's doctor from testifying as to causation).

Similarly, the Fourth Circuit in *Benedi v. McNeil-P.P.C., Inc.*, 66 F.3d 1378, 1384 (4th Cir.1995), upheld the plaintiff's recovery for severe liver damage resulting from his use of Extra-Strength Tylenol contemporaneously with alcohol due to the manufacturer's negligent failure to warn. The Court of Appeals rejected McNeil's argument that the medical causation testimony of the plaintiff's clinical physicians based on the methodology of their discipline, such as the microscopic appearance of his liver, the Tylenol found in his blood, the history of several days of using Tylenol and alcohol, the liver enzyme blood level, and the lack of evidence of a viral or other cause of liver failure, was unreliable because they did not have or rely on epidemiological data. The *Benedi* court stated: "We will not declare [the clinical medicine] methodologies invalid and unreliable in light of the medical community's daily use of the same methodologies in diagnosing patients." *Id.*; *see also*, *Maryland Casualty Co. v. Therm-O-Disc, Inc.*, 137 F.3d 780, 785 (4th Cir.1998)("[T]his circuit has taken the position that the *Daubert* court 'was not formulating a rigid test or checklist,' and was 'relying instead on the ability of federal judges to properly determine admissibility.' ")(citing and quoting *Benedi*, 66 F.3d at 1384).

*Appendix A*

The Third Circuit in *In Re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717 (3rd Cir.1994) held that a clinical physician's methodology of differential diagnosis was sufficiently reliable to support the admissibility of that expert's opinion that polychlorinated biphenyls (PCBs) caused specific plaintiffs' illnesses. The *Paoli* court, heeding *Daubert*'s admonition that the inquiry as to whether a particular technique or method is reliable is a flexible one, *id.* at 742, reasoned that "differential diagnosis can be considered to involve the testing of a falsifiable hypothesis (e.g. that PCBs caused a plaintiff's cancer) through an attempt to rule out alternative causes," and although it "involves assessing causation with respect to a particular individual[,][t]his merely makes it a different type of science than science designed to produce general theories; it does not make it unreliable science." *Id.* at 758. Moreover, the *Paoli* court concluded that a clinical physician's performance of standard diagnostic techniques provides prima facie evidence that a doctor has considered alternative causes and has attempted to test his or her initial hypothesis as to cause. *Id.*

The Court of Criminal Appeals of Texas, a state court of last resort, in *Nenno v. State*, 970 S.W.2d 549, 1998 WL 331283 (Tex.Crim.App. June 24, 1998)("This opinion has not been released for publication in the permanent law reports. Until released, it is subject to revision or withdrawal."), in reviewing the defendant's capital murder conviction and death sentence, held that the trial court did not err in finding reliable and admitting the state's future dangerousness expert's opinion that the defendant would be a threat to society. The expert, an FBI agent who specialized in studying the sexual victimization of children, based his opinion on his study of over 1,000 cases, personal interviews with inmates convicted of child sex offenses, examination of inmates' psychological records, and study of the facts of the offenses involved. The *Nenno* court rejected the defendant's argument that the expert's opinion was not reliable because it did not rely on criteria substantially identical to the *Daubert* factors. Instead, the *Nenno* court concluded that "the four factors listed in *Daubert* do not necessarily apply outside of the hard science context; instead methods of proving reliability will vary, depending upon the field of expertise." *Id.* at 561 (citing the panel opinion in the present case, *Moore v. Ashland Chemical, Inc.*, 126 F.3d 679, 685-689 (5th Cir.1997)).

Although the *Nenno* decision did not involve the testimony of a clinical physician as to cause of disease in a specific person, the court relied directly upon the *Moore* panel decision and its underlying principle that the reliability of an expert witness's opinion ordinarily should be judged by whether it is soundly grounded in the methodology of the expert's discipline. Thus, *Nenno*, which permits experts to predict the future causation of criminal harm by a specific person without the support of any hard scientific, strict *Daubert* factor type methodology, is at odds with the premise of the present *en banc* majority opinion.

In similar manner, additional federal circuit decisions conflict in principle with the en banc majority opinion's insistence on an inflexible, unthinking application of the *Daubert* factors to expert opinions based on knowledge and methodology outside the realm of hard science. *E.g.*, *Tyus v. Urban Search Management*, 102 F.3d 256, 263 (7th Cir.1996)("Social science testimony, like other expert testimony . . . must be tested to be sure that the person possesses genuine expertise in a field and that her testimony adheres to the same standards of intellectual rigor that are demanded in her professional work.") (internal quotation marks and brackets omitted); *Hose v. Chicago Northwestern Transp. Co.*, 70 F.3d 968, 974 (8th Cir.1995)(clinical physician's opinion that patient's inhalation of manganese caused patient's manganese encephalopathy was reliable although based only on patient history, laboratory studies of manganese levels in patient's body and work clothes, clinical examinations, a series of MRIs, and other doctors' reports); *United States v. Jones*, 107 F.3d 1147 (6th Cir.1997)(although *Daubert*'s gatekeeper function is applicable to all expert testimony, the *Daubert* factors do not extend outside the hard scientific orbit to handwriting experts); *see also Tassin v. Sears, Roebuck and Co.*, 946 F.Supp. 1241, 1247-48 (M.D.La.1996)(holding that for an expert's opinion to be considered reliable he must use the methodology of experts in his particular field).

The majority's opinion requiring a rigid, mechanical application of the *Daubert* factors beyond the ambit of the hard sciences also conflicts with the views of leading scholars, jurists and practitioners.[3] For example, the report of the American

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[3] In addition to the views expressed by commentators and practitioners, Stephen A. Saltzburg, et al. 2 FEDERAL RULES OF EVIDENCE MANUAL at 1250- 1251 (7th ed.1998) reports that:

> The Advisory Committee on Evidence Rules has made a determination that Rule 702 should be amended in light of Daubert and its progeny. The Advisory Committee has prepared a working draft for an amended 702, which, at this writing, has yet to receive final approval from the Committee. The working draft, which is adapted from a proposal by Professor Michael Graham, reads as follows:
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> Testimony providing scientific, technical or other specialized information, in the form of an opinion, or otherwise, may be permitted if:

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(1) the information is based upon adequate underlying facts, data or opinions;

(2) the information is based upon a methodology either (a) established to have gained widespread acceptance in the particular field to which the explanative theory belongs, or (b) shown to possess indicia of trustworthiness;

(3) the methodology has been applied reliably to the facts of the case;

(4) the witness is qualified as an expert by knowledge, skill, experience, training or education to provide such information; and

(5) the information will assist the trier of fact to understand the evidence or to determine a fact in issue.

While the language set forth above is still in development, the Advisory Committee has agreed upon some general substantive points. First, the gatekeeper standards of Rule 702 must apply to all expert testimony. . . . . Second, the reliability standards must apply not only to the theory or methodology used by the expert, but also to the application of that theory or methodology in the specific case. . . . Third, it does not pay to get too detailed about the factors that a Trial Judge should use in assessing reliability. . . . The risk of leaving out important reliability factors is especially great because experts in different fields will necessarily use different methodologies, and it would be very difficult to describe an all-inclusive list of reliability factors that would cover the testimony of all experts.

Daubert, 157 F.R.D. 571 (1994) recognizes that the basic *Daubert* requirement that a trial judge determine whether a proffer of expert testimony is reliable or valid applies to all forms of expert testimony and that the particular expert at issue should have her methodology, i.e. the validity of her opinion, judged by the principles applicable to "that particular field." *Id.* at 577. In regard to the specific *Daubert* factors which the majority so rigidly applies, the American College of Trial Lawyers' report concludes that:

> . . . Justice Blackmun's "general observations" about the factors that a federal judge ought to consider in evaluating the soundness of scientific methodology, set forth in part II-C of his opinion, are specifically aimed at the evaluation of scientific testimony. Of course, some of these factors may be highly relevant to an evaluation of certain types of non-scientific expert evidence. For example, whether the proffered methodology can be and has been tested may very well be pertinent to an examination of non-scientific but "technical" expert evidence. Peer review and publication may be an important factor with respect to testimony involving social sciences. And the "general acceptance" of a methodology within a particular discipline will be crucial in many cases. *The point is that any one of Justice Blackman's four factors may or may not have applicability to proffers of non-scientific expert evidence. The inquiry to be made concerns the fundamental principles by which the validity of a methodology is to be judged in the particular field of knowledge. Id.* (footnotes omitted)(emphasis added)

Leading federal evidence commentators have noted that the *Daubert* opinion is ambiguous and has given rise to a number of interpretations. *E.g.* 29 Charles A. Wright and Victor J. Gold, Federal Practice and Procedure § 6266 (1997). They observe that at its narrowest *Daubert* can be read to allow judges to exercise a significant gatekeeping function only in the case of expert testimony in the hard sciences based on novel theories and methodologies. *Id.* at 289. They further state that the broadest reading of *Daubert* is that it applies to all reliability issues presented by all expert testimony. *Id.* at 290. In rejecting the broadest view, Wright and Gold state:

> This broadest interpretation of Daubert should be rejected. As noted above, it is inconsistent with both policy and precedent to make the admissibility of all expert testimony depend upon a showing that the expert's testimony is completely reliable in every respect. Since Daubert does not explicitly take such a position, and nothing in the Evidence Rules compels it, it seems unlikely that the Court intended such a departure from past practice. In overturning Frye, it is unlikely that the Court in Daubert sought to make the admission of scientific evidence harder.
> *Id.* at 290-91 (footnotes omitted).

Professor Michael Graham contends that *Daubert* boxes the courts into working within a structure that has not functioned as anticipated by the Supreme Court and can fairly be said to not have functioned well at all. 2 Michael H. Graham, Handbook of Federal Evidence, § 702.5, pp. 22-26 (Supp.1998). Graham strongly advises against a rigid application of the *Daubert* factors and suggests that:

> Until the *Daubert* box is removed, on balance, it is suggested that *Daubert*'s gatekeeping language should be held by lower courts to apply to "scientific" evidence only. This interpretation is most consistent with the plain meaning of the opinion and the clear choice for liberalization if liberal admissibility is in fact the goal. Most importantly, nonapplication of judicial gatekeeping to "technical or other specialized knowledge" would prevent the hardship incurred by many plaintiffs in product liability litigation. Such an interpretation also avoids unthinking application of the four *Daubert* factors as well as the alternative trying process of developing a list of factors for determining whether a construction worker with 30 years of reinforced concrete experience is testifying to an explanative theory that is sufficiently trustworthy. *Id.* at 25-26.

In *Daubert*, the Supreme Court stated: "The inquiry envisioned by Rule 702 is, we emphasize, a flexible one." *Daubert*, 509 U.S. at 594, 113 S.Ct. 2786. The *en banc* majority opinion, however, heedless of *Daubert*'s precept, and unmindful of the other circuits' unanimous adoption of a flexible approach in applying the *Daubert* factors, holds that district courts in this circuit must unthinkingly and rigidly apply the *Daubert* factors in assessing the reliability of a clinical physician's opinion as to the causal relationship between an individual's exposure to a chemical or substance and that person's disease or medical disorder.[4] This means, of course, that in cases such as the present one, in which the association between a specific chemical compound and a particular disease has not yet been, and perhaps never will be, subjected to hard science investigation, that the plaintiff will be unable to present any expert testimony that his or her exposure to the chemical compound was the probable medical cause of his or her disease.

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[4] The panel opinion in the present case, *Moore v. Ashland Chemical, Inc.*, 126 F.3d 679 (5th Cir.1997), consistently with the

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The *en banc* majority adopts a mechanistic interpretation of the *Daubert* factors that threatens to require the exclusion

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foregoing authorities, concluded that: (1) the basic principles of the Federal Rules of Evidence recognized in *Daubert* apply to the admission or exclusion of every type of expert testimony; (2) a trial judge, therefore, must assess every proffer of expert testimony to determine whether it is relevant to the case and a reliable application of the principles and methodology of that expert's discipline; (3) the Supreme Court in *Daubert* interpreted "scientific knowledge" under Federal Rule of Evidence 702, for purposes of that case, to mean knowledge obtained and tested by the scientific method, i.e., "hard" scientific knowledge; (4) accordingly, the *Daubert* court indicated that a trial court should assess the reliability of expert testimony professedly based on "hard" scientific knowledge using several factors, the "*Daubert* factors," which are "hard" science methods or techniques; (5) clinical medicine (as opposed to research and laboratory medical science) is not, strictly speaking, a "hard" scientific discipline; its goals, subject matter, conditions of study, and well developed, sui generis methodology are quite different from that of purely "hard" science and its methodology; (6) Consequently, a trial judge assessing the reliability of the proffer of a clinical physician's expert testimony based on clinical medical knowledge, without purporting to be based on hard scientific methodology, should determine whether it is a sound application of the knowledge, principles and methodology of clinical medicine; (7) In the present case, the district court committed an error of law by rigidly applying the "*Daubert* factors" and excluding the expert clinical physician's opinion because the doctor did not have any "hard" scientific data to support his clinical medical opinion.

from evidence of vast numbers of clinical medical opinions, although they are generally accepted as trustworthy by physicians practicing in their fields, and, until the majority's decision today, were routinely accepted as reliable by our courts both before and after *Daubert*. *See Carroll v. Morgan*, 17 F.3d 787, 789-90 (5th Cir.1994). Disturbingly, the majority does not explain the reasons for its deviation from the other circuits or its departure from the prior precedent and practice in our courts. Ironically, the majority's divergence occurs in a rather run-of-the-mill setting, a case involving a clinical physician's opinion, based on generally accepted clinical methodology, as to the cause of a non-catastrophic disease following a person's episodic and traumatic occupational exposure to a chemical compound. Unlike *Daubert*, and other highly publicized toxic torts cases, the present case does not involve "junk science," or purportedly hard scientific opinions, based on epidemiological and animal studies not generally accepted in their discipline, as to the surreptitious causal relationship between drugs or other substances and catastrophic systemic diseases or disorders such as cancer and birth defects.

(b)

Having depleted the ranks of medical causation experts available to plaintiffs suffering non-catastrophic chemical exposure injuries, the majority adds insult to injury by casting doubt on the importance of a principal element used by both hard scientific and clinical medical experts in determining whether there is a causal relationship between an individual's exposure to a substance and his or her disease viz., the temporal relationship between the person's exposure and the development of symptoms or signs of disease. The majority asserts that in the absence of an established scientific connection between exposure and illness or compelling circumstances, the temporal connection between exposure to chemicals and an onset of symptoms is entitled to little weight in determining causation. Maj. Op. at p. 278. This dictum conflicts with the great weight of scientific and judicial authority.

In the sphere of hard science, the opinion of an expert who opines that exposure to a compound caused a person's disease is "based on an assessment of the individual's exposure, including the amount, *the temporal relationship between the exposure and disease*, and exposure to other disease-causing factors." Federal Judicial Center, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE, p. 205 (1994)(emphasis added). The temporal relationship may either support or contradict causation. "In most *acute* injuries, there is a short time period between cause and effect. However, in some situations, the length of basic biological processes necessitates a longer period of time between initial exposure and the onset of observable disease." *Id.* at 207. Moreover, temporal relationship is one of the seven factors that an epidemiologist considers in determining whether the association between an agent and a disease is causal. *Id.* at 161.

Courts and commentators have also recognized that the fact that an individual's symptoms followed an appropriate time after exposure is an important consideration in determining causation. *E.g.*, *Kannankeril v. Terminix Int'l., Inc.*, 128 F.3d 802, 805, 809 (3rd Cir.1997); *Zuchowicz*, 140 F.3d at 385 (affirming the admissibility of an expert whose "conclusion was based on the temporal relationship between the overdose and the start of disease and the differential etiology method of excluding other possible causes."); 1 Margie Searcy-Alford, A GUIDE TO TOXIC TORTS § 10.03[2], p. 10- 69 (1998)("The fact that the symptoms follow an appropriate time after exposure does not prove causation, but it is an important consideration."); Stephen A. Saltzburg et al., FEDERAL RULES OF EVIDENCE MANUAL at 1233-1234 (7th ed.1998); *see Benedi v. McNeil-P.P.C., Inc.*, 66 F.3d 1378, 1384 (4th Cir.1995); 3 Stuart M. Speiser et al., THE AMERICAN LAW OF TORTS § 11.27, at 465 (1986).

The district court case relied on by the majority, *Cavallo v. Star Enter.*, 892 F.Supp. 756 (E.D.Va.1995), is distinguishable in numerous respects and does not support the majority's assertion that temporal relationship is entitled to "little weight" in the absence of compelling circumstances. In *Cavallo*, the plaintiff's exposure occurred in the open parking lot of a shopping mall during a five minute period at a distance of 500 feet from the source of the jet fuel fumes, the chemical substance at issue; she did not seek medical assistance until nine days later for her symptoms that resulted in an initial diagnosis of "conjunctivitis, or eye redness;" her experts did not have even a rough idea of the amount of her exposure; and there was no showing that the fumes the plaintiff inhaled from the defendant's alleged negligent spillage were actually more dense than the ordinary daily atmosphere in the shopping mall near defendant's petroleum distribution, mixing and transfer terminal. Significantly, Cavallo's experts did not have a material safety data sheet (MSDS) or full knowledge of some of the chemicals inhaled and, more importantly, they did not reliably use or apply the methodology of their own disciplines.

In sum, the *Cavallo* court ruled the experts' opinions inadmissible because their opinions were based almost exclusively on a very tenuous temporal and spatial connection between exposure and symptoms and because they significantly departed from the accepted toxicology methodology, while the defendant's toxicology expert followed the generally accepted methodology of that discipline. *Id.* at 763, 773. Moreover, the *Cavallo* court never said that, in the absence of compelling circumstances, a temporal relationship is "entitled to little weight." Instead, that court merely observed that there may be instances where the temporal connection is so compelling as to dispense with the need for toxicologists to rely on the standard methodology of their discipline. *Id.* at 773.

### (c)

As a coup de grace to inhalation injury claimants, the majority indicates that, if a plaintiff's expert does not have scientifically accurate measurements of the level of the plaintiff's exposure, "his causation opinion [will be] suspect even if he ha[s] scientific support for the position that the [chemical compound] could cause [the plaintiff's disease]." Maj. Op. at p. 278 n. 9. The majority downplays the lethal swath of its new rule by suggesting that it applies here because of "the paucity of the facts Dr. Jenkins had available about the level of Mr. Moore's exposure." But the truth is that Dr. Jenkins had better information about the nature of the substances, the level of exposure, and its duration than experts in most inhalation accident cases.[5] "Only rarely are humans exposed to

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[5] As explained by the panel opinion:

> From Moore's history that Dr. Jenkins had taken, he had information that before the exposure Moore was in good health, that two 400 pound drums of the chemicals had begun leaking in the back of Moore's truck at some time before his arrival at Ashland, that Moore's rig consisted of a diesel tractor and a 28 foot enclosed trailer, that after the

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chemicals in a manner that permits a quantitative determination of adverse outcomes. [ ] Human exposure occurs most frequently in occupational settings where workers are exposed to industrial chemicals like lead or asbestos; however, even under these circumstances, it is usually difficult, if not impossible, to quantify the amount of exposure." Federal Judicial Center, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE, p. 187 (1994). Consequently, the majority's rule will apply in virtually all inhalation cases to exclude the opinions of plaintiffs' experts as to specific medical causation even if they are fortunate enough to have hard science data supporting a general causal relationship or association between the chemical compound and the disease involved. The majority does not have even a paucity of authority to support this extra, gratuitous

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> discovery of the leakage upon arrival at Ashland the drums were allowed to continue to leak inside the trailer with the doors shut for another 45 minutes until the Ashland supervisor told Moore to remove them, that at this point the 400 pound drums had become light enough to allow Moore and others to roll them manually out onto the dock, that Moore and a co-employee worked in and around the trailer for about 45 to 60 minutes sprinkling "Absorbo" over the contaminated areas sweeping the saturated material into shovels, removing the materials from the trailer, and shoving the leaking drums into salvage drums, that Moore finished the cleanup at Ashland about 11:00 a.m., that Moore began to experience tightness of chest at about 11:45 a.m., that as his symptoms were continuing to worsen Moore consulted the company doctor who put him on "oxygen and inhalants." *Moore*, 126 F.3d at 702.

From this information, Dr. Jenkins was able to roughly estimate that Mr. Moore had been exposed to possibly "200 parts per million or higher" of the chemical compound. *Id.* at 695.

ratcheting down of inhalation accident victims' chances of recovery.

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The majority has conducted a trial de novo of the district court's preliminary assessment of whether the reasoning and methodology underlying Dr. Jenkins' testimony was reliable, substituting its own erroneous judgment and reasoning for that of the trial judge, rather than reviewing the district court's rulings and reasoning for abuse of discretion, *General Electric Co. v. Joiner*, __ U.S. __, 118 S.Ct. 512, 517, 139 L.Ed.2d 508 (1997), clearly erroneous factual findings, *Bourjaily v. United States*, 483 U.S. 171, 181, 107 S.Ct. 2775, 97 L.Ed.2d 144 (1987), and errors of law, *Koon v. United States*, 518 U.S. 81, 100, 116 S.Ct. 2035, 135 L.Ed.2d 392 (1996)("A district court by definition abuses its discretion when it makes an error of law").

In the district court proceedings, the defendants objected to the introduction of Dr. Jenkins' opinion as to the diagnosis and cause of Mr. Moore's disease on the grounds that the doctor lacked hard scientific support that the chemical compound involved could cause reactive airways disease. The district court admitted Dr. Jenkins' opinion that Mr. Moore had reactive airways disease but excluded Dr. Jenkins' opinion that the disease had been specifically caused by exposure to the chemical compound involved because Dr. Jenkins had not presented any hard scientific support for a general causal link or association between that particular compound and that particular disease.[6]

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[6] Dr. Jenkins performed a physical examination, took a detailed medical history, observed Moore on three occasions, reviewed the MSDS

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The majority opinion retries the preliminary assessment of Dr. Jenkins' proffer de novo and concludes that (1) the district court was "entitled to conclude" that (a) Dr. Jenkins had not explained in sufficient detail how his differential diagnosis or etiology and his training and experience were helpful in reaching his conclusion on causation; (b) the MSDS had limited value in supporting Dr. Jenkins' opinion because he did not know what tests Dow had conducted in preparing the MSDS or what level of exposure was necessary for a person to sustain the injuries warned of in the MSDS; (c) Mr. Moore's asthma in his youth, history of smoking and recovery from pneumonia shortly before his exposure made Dr. Jenkins' opinion even more unreliable; and (d) the "analytical gap" between Dr. Jenkins's causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide; and (2) Dr. Jenkins did not explain precisely how the irritating properties in the compound described by the MSDS were similar to those in other chemicals or compounds that had been linked with reactive airways disease.

Dr. Jenkins testified that he did not know what tests Dow had performed in preparing the MSDS warnings of the hazards

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prepared by Dow Corning, and performed a series of tests on Moore including pulmonary function tests, a bronchodilator test, a spirometry test, a plethysmographic test, a lung volume determination, an intrapial gas distribution test, a diffusion test, an arterial bloods test, a mechanics test, X-rays, and laboratory tests. Dr. Jenkins reviewed the medical records and reports of a bronchodilator test performed by Dr. Simi two to three weeks after the accident that showed severe airways obstruction. Additionally, Dr. Jenkins reviewed a report of an allergy test performed by Dr. Alvarez, which ruled out allergic or immunologic disease and confirmed RADS. Finally, Dr. Jenkins also relied upon the temporal proximity between the exposure to the chemicals at the Ashland facility and the onset of symptoms.

of the chemical compound. The district court commented on this fact but based its ruling on the lack of hard scientific support for the doctor's clinical medical opinion, not on his lack of knowledge of Dow's testing. The MSDS was introduced without objection and referred to in testimony by the experts on both sides, none of whom professed to have any knowledge of Dow's MSDS-related testing. The record clearly demonstrates that Dr. Jenkins used the MSDS only for the same purpose as did the other experts, merely as a source of information as to the kinds of chemicals in the compound to which Mr. Moore had been exposed. Thus, the district court evidently gave no weight to the experts' lack of knowledge of Dow's testing, and if it did find any relevance in this fact, it would have been clearly erroneous in doing so. *See Moore*, 126 F.3d at 701.

The district court, moreover, did not base its decision on many of the findings and reasons that the majority now attributes to it. Neither the defendant nor the district court found any fault with Dr. Jenkins' qualifications[7], experience, testimony regarding the similarity of irritating chemical properties, or his proper performance of differential etiology to eliminate alternative causes of Mr. Moore's disease. Because the defendant did not object to Dr. Jenkins' opinion on these grounds or question him on these points and the district court did not base its ruling on them, these issues should not be raised *sua sponte* by this court. The performance of physical examinations, taking of medical histories, and employment of reliable laboratory tests provide significant evidence of a reliable differential diagnosis and prima facie evidence that a doctor has considered alternative causes and has attempted to test his or her initial hypothesis as to cause. *See Paoli*, 35 F.3d at 759. The failure of the defendant or the district court to ask for, or the doctor's failure to volunteer, further elaboration on how each differential diagnosis test is designed to eliminate each alternative cause of disease or a chemistry professor's exegesis on the structure and composition of each chemical identified as having similar irritating properties, does not afford a proper basis for an appellate trial de novo on the record of the district court's preliminary assessment hearing.

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[7] The majority opinion fails to point out that Dr. Jenkins' qualifications were never an issue at any point in these proceedings. In fact, Dr. Jenkins was more than eminently qualified to render an opinion in this matter as a brief summary of his education, training and experience reveals. Dr. Jenkins received his medical degree from the University of Texas in 1940, received training at the University of Michigan Hospital as an intern, resident in Tuberculosis and Chest Disease and resident in Allergy in 1940-45, served as Instructor and Chief Resident in Medicine and Assistant of Medicine and Physician in charge of the Tuberculosis and Chest Unit, University of Michigan Medical School, 1943 to 1947, was certified by the American Board of Internal Medicine in 1947, served in various capacities as a professor at Baylor College of Medicine from 1947-91 where from 1947-74 he was chief of the Pulmonary Disease Section and from 1975-91 chief of environmental medicine. Additionally,
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Likewise, the defendants did not contend, and the trial judge did not rule, that Dr. Jenkins' opinion was inadmissible because of Mr. Moore's childhood asthma, smoking or pneumonia. Dr. Jenkins concluded that the exposure to the chemical compound triggered Mr. Moore's reactive airways disease after taking these and all other relevant factors into consideration. The plaintiff is not required to prove that the exposure was the exclusive cause of the disease. It is well settled

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in the course of over fifty years of practicing medicine, Dr. Jenkins has examined and evaluated over 100 persons for injuries occurring from exposure to various chemical compounds in an occupational setting.

in Texas and elsewhere that a defendant takes the plaintiff as he finds him. *Coates v. Whittington*, 758 S.W.2d 749, 752 (Tex.1988)(citing *Driess v. Friederick*, 73 Tex. 460, 11 S.W. 493, 494 (1889)); *Mondragon v. Austin*, 954 S.W.2d 191, 194 (Tex.Ct.App.1997); *see Maurer v. United States*, 668 F.2d 98, 99-100 (2nd Cir.1981)("It is a settled principle of tort law that when a defendant's wrongful act causes injury, he is fully liable for the resulting damage even though the injured plaintiff had a preexisting condition that made the consequences of the wrongful act more severe than they would have been for a normal victim. The defendant takes the plaintiff as he finds him."); W. Page Keeton, et al., PROSSER AND KEETON ON TORTS § 43 at 291-92 (5th ed.1984).

The majority's most blatant addition of its own ex post facto finding and rationale in an effort to bolster the district court's ruling, however, is its erroneous claim that the district court found "that the 'analytical gap' between Dr. Jenkins's causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide." Maj. Op. p. 279. The district court made no such finding. The term "analytical gap," comes from the Supreme Court's *Joiner* opinion of 1997, *see* 118 S.Ct. at 519, and does not appear in the district court's 1995 ruling in the present case.[8] Moreover, as explained above, the district court based its decision on the same erroneous theory as the majority's primary rationale, i.e.,

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[8] In *General Electric Co. v. Joiner*, __ U.S. __, 118 S.Ct. 512, 139 L.Ed.2d 508 (1997), the Supreme Court held that abuse of discretion, rather than the particularly stringent standard of review applied by the court of appeals in that case, is the proper standard by which to review a district court's decision to admit or exclude scientific evidence. The plaintiff Joiner proffered expert testimony based on hard science methodology, animal and epidemiological studies, to prove that the defendants' PCBs and related products had caused his lung cancer. "Joiner's experts used a 'weight of the evidence' methodology to assess

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whether Joiner's exposure to transformer fluids promoted his lung cancer. They did not suggest that any one study provided adequate support for their conclusions, but instead relied on all the studies taken together (along with their interviews of Joiner and their review of his medical records)." *Id.*, 118 S.Ct. at 521 (Stevens, J. concurring in part and dissenting in part) (footnote omitted). The district court examined the studies and excluded the experts' opinions on the ground that none of the studies was sufficient alone to show a link between PCBs and lung cancer.

The Supreme Court held that the district court did not abuse its discretion in excluding the experts' testimony on grounds that the studies upon which the experts relied were not sufficient, whether individually or in combination, to support their conclusions. The Supreme Court remarked that "[a] court may conclude that there is simply too great an analytical gap between the data and the opinion proffered." *Id.* at 519.

In the present case, there was no "analytical gap" between Dr. Jenkins' data and his opinion that Mr. Moore's exposure caused his disease. In fact, the district court allowed Dr. Alvarez to use the identical data to express the same opinion. It is easy to see that the district court's decision in *Joiner* was reasonable and not an abuse of discretion because the plaintiff himself conceded that there was an analytical gap between each one of his expert's studies and the conclusion that PCBs caused his cancer. He argued, although unsuccessfully, however, that every analytical gap could be bridged if all of the experts' studies were considered in combination. In the present case, the district court excluded Dr. Jenkins' opinion simply because he did not have any hard scientific support for his clinical medical opinion, not because of a gap in reasoning. Dr. Jenkins' clinical medical opinion was, in fact, snugly based on the sound application of the well accepted methodology of his discipline. Thus, *en banc* the majority itself is simply attempting to bridge too great an analytical gap by trying to stretch *Joiner* to cover the present case.

that a clinical medical physician cannot express an admissible opinion, regardless of how soundly he or she relies on and applies well settled clinical medical methodology, unless the opinion is further supported by hard science, rigid *Daubert* factor type data.

### *Conclusion*

In the final analysis, this case presents the legal question of the proper interpretation of Federal Rule of Evidence 702 and *Daubert* in cases involving expert witness proffers based on knowledge beyond the realm of hard scientific knowledge. Indeed, the majority *en banc* opinion is far too "rulefied" for anyone to seriously contend that it does not set broad, eccentric precedents that will profoundly affect the trials and outcomes in substantial numbers of future cases involving injuries and diseases alleged to have been caused by exposure to chemical compounds. The *en banc* majority, in my opinion, makes several errors of law, the most serious of which is its holding that a clinical medical expert, whose opinion is based on a sound application of the principles and methodology of his or her discipline, cannot reliably testify as to the causal relationship between and individual's exposure to a chemical compound and his or her subsequent onset of symptoms and disease. As a result of this error of law and others, the *en banc* opinion subverts the liberal thrust of the Federal Rules of Evidence and the principles enunciated in *Daubert* by locking the gate on causation evidence derived through the principles and methodology of clinical medicine.

# APPENDIX B — EN BANC ORDER OF THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT DATED AND FILED NOVEMBER 12, 1997

IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 95-20492

BOB T. MOORE and SUSAN MOORE,

Plaintiffs-Appellants-
Cross-Appellees,

versus

ASHLAND CHEMICAL, INC., and ASHLAND OIL, INC.,

Defendants-Appellees-
Cross-Appellants,

and

DOW CORNING CORPORATION and CDC SERVICES, INC.,

Defendants.

Appeals from the United States District Court for the
Southern District of Texas

(Opinion October 20, 1997, 5 Cir., 1997, __ F.3d __)

(November 12, 1997)

Before KING, JOLLY, HIGGINBOTHAM, DAVIS, JONES, SMITH, DUHÉ, WIENER, BARKSDALE, EMILIO M. GARZA, DeMOSS, BENAVIDES, STEWART, PARKER and DENNIS, Circuit Judges.*

BY THE COURT:

A majority of the judges in active service having determined, on the court's own motion, to rehear this case en banc,

IT IS ORDERED that this cause shall be reheard by the court en banc with oral argument on a date hereafter to be fixed. The Clerk will specify a briefing schedule for the filing of supplemental briefs.

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* Chief Judge Politz is recused and did not participate in this decision.

# APPENDIX C — PANEL OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT DATED OCTOBER 20, 1997

**Bob T. MOORE and Susan Moore,**
**Plaintiffs-Appellants Cross-**
**Appellees,**

**v.**

**ASHLAND CHEMICAL, INC. and**
**Ashland Oil, Inc., Defendants-**
**Appellees Cross-Appellants.**

**No. 95-20492.**

United States Court of Appeals,
Fifth Circuit.

Oct. 20, 1997.

* * *

Before DAVIS and DENNIS, Circuit Judges, and FALLON, District Judge[1]:

DENNIS, Circuit Judge:

In this negligence case, we are called upon to determine the standards for assessing the reliability of the proffer of a clinical physician's expert opinion as to the cause of a plaintiff's disease in the light of *Daubert v. Merrell Dow Pharmaceuticals,*

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[1] District Judge of the Eastern District of Louisiana, sitting by designation.

*Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). We conclude that: (1) the basic principles of the Federal Rules of Evidence recognized by *Daubert* apply to the admission or exclusion of every type of expert testimony; (2) a trial judge, therefore, must assess every proffer of expert testimony to determine whether it is relevant to the case and reliable under the principles and methodology of the discipline involved; (3) the Supreme Court in *Daubert* interpreted "scientific knowledge" under Federal Rule of Evidence 702 to mean knowledge obtained and tested by the scientific method, i.e. "hard" or "Newtonian" scientific knowledge; (4) accordingly, the *Daubert* Court indicated that a trial court should assess the reliability of expert testimony professedly based on "hard" scientific knowledge using several factors, the "*Daubert* factors," which are "hard" science methods or techniques; (5) clinical medicine (as opposed to research and laboratory medical science) is not a hard science discipline; its goals, subject matter, conditions of study and well developed methodology are sui generis and quite different from that of hard science and its methodology; (6) consequently, a trial judge assessing the reliability of the proffer of a clinical physician's expert testimony based on clinical medical knowledge should determine whether it is soundly grounded in the knowledge, principles and methodology of clinical medicine; the "*Daubert* factors," which are techniques derived from hard science methodology, are, as a general rule, inappropriate for use in making the reliability assessment of expert clinical medical testimony.

The foregoing conclusions are the results of our conscientious efforts to determine the standard for admitting clinical medical testimony under the Federal Rules of Evidence as interpreted by the Supreme Court in *Daubert* and by this court in *Watkins v. Telsmith, Inc.*, 121 F.3d 984 (5th Cir.1997) and other authorities cited herein. They represent neither a "let it all in" nor a "keep it all out" view. Instead, they reflect the interplay of the basic principles of the Federal Rules of Evidence, viz., the liberal standards of admissibility and relevance of Rules 401 and 402 and the assumption underlying Rules 702 and 703 "that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline." *Daubert*, 509 U.S. at 587, 592, 113 S.Ct. at 2793, 2796.

## I. Introduction

Plaintiffs-appellants, Bob T. Moore and his wife, Susan Moore, filed this suit against the defendants-appellees in Texas state court, alleging that Moore had contracted reactive airways disease as the result of the defendants-appellees' negligence in causing Moore to be exposed to a mixture of chemical gases on their premises. Defendants-appellees removed the suit to federal court on diversity grounds.

Before trial the plaintiffs proffered the testimony of two well credentialed clinical physician experts, Dr. Daniel Jenkins and Dr. Antonio Alvarez, who expressed identical opinions based on clinical medical methodology that Bob T. Moore suffered from reactive airways disease that had been caused by his inhalation of the mixture of chemical gases on defendants-appellees' premises. Dr. Jenkins based his opinion on his firsthand observations in examining and taking a history from Bob T. Moore, on the results of tests he performed or had performed on Moore, and on facts and data he obtained from other physicians who had previously examined, tested and treated Moore. Dr. Alvarez essentially adopted the facts, data and conclusions developed and compiled by Dr. Jenkins. To confirm his opinion before the proffer, Dr. Jenkins reviewed and considered reports he received of Dr. Alvarez's subsequent treatment and allergy testing of Bob T. Moore. In response, the defendants-appellees moved to exclude the testimony of Dr. Jenkins and Dr. Alvarez on the grounds that the proffers failed to demonstrate reliable bases for their opinions.

The trial court concluded that the proffer of Dr. Jenkins' testimony demonstrated a reliable basis for his diagnosis of Moore's reactive airways disease. However, the court excluded Dr. Jenkins' opinion that Moore's exposure to the chemicals caused the disease on dual grounds, viz., (1) that under Federal Rule of Evidence 702 the opinion did not have a reliable basis, and (2) that under Federal Rule of Evidence 403 the probative value of the opinion was outweighed by the prejudice that would be caused by Dr. Jenkins' highly impressive qualifications. The trial court admitted Dr. Alvarez's opinions as to both diagnosis and cause of disease as evidentiarily reliable, despite the fact that Dr. Alvarez relied heavily on Dr. Jenkins' opinion and based his own opinion essentially on the same data that had been developed and used by Dr. Jenkins.

At the jury trial, Dr. Jenkins' testimony was limited to his diagnosis of Moore's disease and did not touch on causation. Dr. Alvarez testified as to both the diagnosis and the cause of the disease. Dr. Alvarez, however, was forced to admit that in forming his opinions he relied heavily on the work and opinions of Dr. Jenkins. Dr. Alvarez was unable to explain possible discrepancies in the data he used that had been compiled by Dr. Jenkins. Counsel for the defendants-appellees in closing argument pointed out that Dr. Alvarez was not as highly qualified as their medical causation expert who testified that Moore's disease had not been caused by exposure to the mixture of chemicals.

The jury answered "No" to an interrogatory asking whether the negligence, if any, of the defendants-appellees had proximately caused the injury in question. The district court entered a take nothing judgment against the plaintiffs. The plaintiffs appealed, assigning as error the trial court's ruling that excluded Dr. Jenkins' testimony as to his opinion or inference that Moore's disease had been caused by his exposure to the chemicals he encountered at the defendant-appellees' facility.

## II. *Daubert*'s Illumination and Impact

The trial court's oral ruling excluded Dr. Jenkins' opinion as to cause of disease under Rules 702 and 403, apparently based on the court's understanding of the Rules as interpreted and impacted by the Supreme Court's decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). Therefore, before analyzing the trial court's interpretation and application of the law to the particular proffer of expert testimony, we will set forth our reading of the essential elements of the pertinent Federal Rules of Evidence that have been illumined and impacted by *Daubert*.

### A. Rule 702

Rule 702 provides that:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

In admitting expert testimony, Rule 702 requires that two preliminary determinations be made by the trial court. First, the proffered witness must be qualified as an expert by knowledge, skill, experience, training, or education. Second, the proffered expert's opinion, inference or other testimony must be based on scientific, technical or other specialized knowledge that will assist the trier of fact to understand the evidence or determine a fact in issue. To facilitate discussion, we refer to these as the "qualifications" and "knowledge" components of Rule 702.

1. Qualifications

An expert must have scientific, technical or other specialized knowledge, and a witness may be qualified as an expert by reason of knowledge, skill, experience, training or education. Fed.R.Evid. 702; *Christophersen v. Allied-Signal Corp.*, 939 F.2d 1106, 1110 (5th Cir.1991)(*en banc*). Rule 702, according to the Advisory Committee Note, permits expert testimony not only by experts carrying formal credentials such as university degrees and professional memberships but also by so-called skilled witnesses, whose experiences permit them to testify with authority on a given topic. *Id.* The areas of inquiry that expert testimony may address are similarly broad, including scientific and technical questions as well as any other areas of specialized knowledge. *Id.* The question of whether the witness is sufficiently qualified as an expert is a matter to be decided by the court pursuant to Rule 104(a). *United States v. Normile*, 587 F.2d 784 (5th Cir.1978); *Loftin & Woodard, Inc. v. United States*, 577 F.2d 1206 (5th Cir.1978). In making this inquiry, the trial court has wide discretion in determining the qualifications of a witness as an expert with respect to a particular subject. *Hamling v. United States*, 418 U.S. 87, 108,

94 S.Ct. 2887, 2902, 41 L.Ed.2d 590 (1974), *reh'g denied*, 419 U.S. 885, 95 S.Ct. 157, 42 L.Ed.2d 129 (1974); *Robert v. Conti Carriers & Terminals, Inc.* 692 F.2d 22 (5th Cir.1982).

In *Daubert*, the question of an expert's qualification under Rule 702 was not raised. The court stated that the experts were well or impressively credentialed. *Daubert*, 509 U.S. at 582-583, 113 S.Ct. at 2791-92. Accordingly, *Daubert* does not affect the foregoing principles pertaining to qualifications.

2. Knowledge

In *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), the Supreme Court was called upon to determine the standard for admitting expert scientific testimony in a federal trial. *Id.* at 582, 113 S.Ct. at 2791. The court had granted certiorari in light of sharp divisions among courts applying and rejecting the test of *Frye v. United States*, 54 App.D.C. 46, 47, 293 F. 1013, 1014 (D.C.Cir.1923) that expert opinion based on a scientific technique is inadmissible unless the technique is "generally accepted" as reliable in the relevant scientific community. *Daubert*, 509 U.S. at 585, 113 S.Ct. at 2792.

The court held that the *Frye* "general acceptance" test had been displaced by the Federal Rules of Evidence, observing that: Rule 702 specifically governing expert testimony does not establish "general acceptance" as an absolute prerequisite to admissibility; the drafting history of the rule does not indicate an intention to incorporate such a standard; and a rigid "general acceptance" standard would be at odds with the liberal thrust of the Federal Rules and their general approach of relaxing the traditional barriers to opinion testimony. *Id.* at 588-589, 113 S.Ct. at 2794-2795.

The Supreme Court also held that the Federal Rules require the trial judge to ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable. *Id.* at 589, 113 S.Ct. at 2794. Citing Rule 702 as the primary locus of this obligation, the court decided that the trial judge, when faced with a proffer of expert scientific testimony, must determine pursuant to Rule 104(a) whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. The court explained that this entails a preliminary assessment of whether the underlying reasoning of the scientific testimony is soundly grounded in scientific knowledge and methodology and can be relevantly applied to the facts in issue. *Id.* at 592, 113 S.Ct. at 2796.

### a. Hard Scientific Knowledge

Speaking specifically of "scientific knowledge," the Court stated that the adjective " 'scientific' implies a grounding in the methods and procedures of science." *Id.* The Court elaborated:

> " 'Science is not an encyclopedic body of knowledge about the universe. Instead, it represents a *process* for proposing and refining theoretical explanations about the world that are subject to further testing and refinement. . . .' But, in order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation — i.e., 'good grounds,' based on what is known. In short, the requirement that an expert's testimony pertain to 'scientific knowledge'

establishes a standard of evidentiary reliability." *Id.* quoting from Brief for American Association for the Advancement of Science et al. as Amici Curiae 7-8. (Parentheses omitted; emphasis in original).

Thus, the *Daubert* Court defined "scientific knowledge" in terms of "hard science" or "Newtonian science" i.e., knowledge obtained and tested through "the scientific method," of which Sir Issac Newton was the leading exponent. *See* Edward J. Imwinkelried, *The Next Step After Daubert, Developing A Similarly Epistemological Approach To Ensuring The Reliability of Nonscientific Expert Testimony*, 15 Cardozo L.Rev. 2271, 2276-2277 (1994)(citing 5 THE ENCYCLOPEDIA OF PHILOSOPHY 490-491 (Paul Edwards ed., 1967)); Jennifer Laser, Comment, *Inconsistent Gatekeeping in Federal Courts: Application of Daubert v. Merrell Dow Pharmaceuticals, Inc. to Nonscientific Expert Testimony*, 30 Loy. L.A.L.Rev. 1379, 1404 (1997); *United States v. Hall*, __ F.Supp. __, __ (C.D.Ill.1997); *United States v. Starzecpyzel*, 880 F.Supp. 1027, 1039 (S.D.N.Y.1995).

The methodology of hard or Newtonian science is what distinguishes it from other fields of human inquiry. See Michael D. Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation*, 86 NW.U.L.REV. 643, 645 (1992). "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified. . . .Theoretically, therefore, hypotheses are not affirmatively proved, only falsified. Of course, if a hypothesis repeatedly withstands falsification, one may tend to accept it even if conditionally true." *Id.* at 645-646 (citing Karl R. Popper, *The Logic of Scientific Discovery* (1965); David L.

Faigman, *To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy*, 38 EMORY L.J. 1005, 1015-17(1989); *Interdisciplinary Panel on Carcinogenicity, Criteria for Evidence of Chemical Carcinogenicity*, 225 SCI. 682, 683 (1984)).

### b. Knowledge Outside the Realm of Hard Science

In *Daubert* the Supreme Court noted that, although Rule 702 also applies to "technical, or other specialized knowledge," its discussion was "limited to the scientific context because that is the nature of the expertise offered here." *Id.* at 590 n. 8, 113 S.Ct. at 2795 n. 8. Nevertheless, we conclude that, except where it is self-evident that the court's remarks specifically apply only to "scientific knowledge," that the general principles of Rule 702 recognized by the decision are applicable to other species of expert testimony. Moreover, in *Watkins v. Telsmith*, 121 F.3d 984, 991 (5th Cir.1997), another panel of this court recently concluded that "whether an expert's testimony is based on 'scientific, technical or other specialized knowledge,' *Daubert* and Rule 702 demand that the district court evaluate the methods, analysis, and principles relied upon in reaching the opinion."

The Daubert court began by stating that "[w]e interpret the legislatively-enacted Federal Rules of Evidence as we would any statute." *Id.* at 587, 113 S.Ct. at 2793(citing *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 163, 109 S.Ct. 439, 446, 102 L.Ed.2d 445 (1988))("Because the Federal Rules of Evidence are a legislative enactment, courts turn to the 'traditional tools of statutory construction in order to construe their provisions.' ") Accordingly, a court must not be guided by a single sentence or member of a sentence, but look to the provisions of the whole law, and to its object and policy. *United States Nat. Bank of Or. v. Independent Ins. Agents of America*, 508 U.S. 439, 455, 113 S.Ct. 2173, 2182, 124 L.Ed.2d 402 (1993)(citing *United States v. Heirs of Boisdore*, 49 U.S. (8 How.) 113, 122, 12 L.Ed. 1009 (1849)). A statutory text consists of words living a communal existence, the meaning of each word informing the others and all taking their purport from their context. *Id.* at 454, 113 S.Ct. at 2182 (citing *NLRB v. Federbush, Co.*, 121 F.2d 954, 957 (2nd Cir.1941)(L.Hand, J.)). The maxim noscitur a sociis, that a word is known by the company it keeps, is often used to avoid giving one word a scope inconsistent with its companions and thus giving " 'unintended breadth to the Acts of Congress.' " *Gustafson v. Alloyd Co.*, 513 U.S. 561, 575, 115 S.Ct. 1061, 1069, 131 L.Ed.2d 1 (1995)(citing and quoting *Jarecki v. G.D. Searle & Co.*, 367 U.S. 303, 307, 81 S.Ct. 1579, 1582, 6 L.Ed.2d 859 (1961)).

Consequently, the requirements that *Daubert* found to be inherent in Rule 702, viz., that the trial judge must ensure that the expert's evidence is not only relevant, but reliable, must be applicable to "technical, or other specialized knowledge," as well as to scientific testimony. Otherwise, Rule 702 would not place limits on the admissibility of non-scientific expert testimony comparable to those it imposes on purportedly scientific evidence.

Moreover, the *Daubert* opinion at several points clearly implies that it is drawing on principles of the Federal Rules that are generally applicable to all types of expert testimony. The court stated that "Rule 702 . . . clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify." *Daubert*, 509 U.S. at 589, 113 S.Ct. at 2794. Further, the court observed that the premise for the relaxation of the usual requirement of first-hand knowledge when any type of qualified expert testifies is "an assumption that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline." *Id.* at 592, 113 S.Ct. at 2796. Thus, *Daubert* plainly indicates that the trial judge, when faced with the proffer of expert testimony in any field of study, must determine whether the reasoning or methodology underlying the testimony is valid under the principles of the discipline involved. *Id.*; *See* American College of Trial Lawyers, *Standards And Procedures For Determining The Admissibility Of Expert Evidence After Daubert*, 157 F.R.D. 571, 578 (1994).

### c. Reliability: The expert's opinion or inference must be grounded in the methodology of his discipline.

The *Daubert* court read Rule 702 to provide that " '[i]f scientific technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue' " an expert " 'may testify thereto.' " *Daubert*, 509 U.S. at 589, 113 S.Ct. at 2794 (emphasis by Court deleted). "Knowledge" in this context " 'applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds.' " *Id.* at 590, 113 S.Ct. at 2795(quoting WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1252 (1986)).

In Daubert, the Court indicated that, (1) "scientific knowledge" within Rule 702 means principles, theories, techniques or inferences derived by the scientific method or by a body of sound scientific methods; and (2) that the proffered expert's opinion, inference, or testimony based on scientific knowledge, in order to have evidentiary reliability or trustworthiness, must be derived or inferred by the same methods. *Id.* at 590 n. 9, 113 S.Ct. at 2795; *See also* the court's "general observations" on principal scientific methods. *Id.* at 593-594, 113 S.Ct. at 2796-2797.

By the same token, we conclude that, under Rule 702, an opinion based on other technical or specialized knowledge, must be grounded in the principles, methods and procedures of the particular field of knowledge involved. Every discipline employs a body of methods, rules, and postulates, i.e., methodology, both in its ordinary functions and in developing and adopting new concepts, techniques, and analogues. Therefore, the "knowledge" of each discipline, under Rule 702, is both its principles and methodology and the theories, techniques or inferences produced through its methodology. Thus, the proffered opinion of any expert in a field of knowledge, in order to be evidentiarily reliable, must either be based soundly on the current knowledge, principles and methodology of the expert's discipline or be soundly inferred or derived therefrom.

As the American College of Trial Lawyers' report concludes, "[W]hether the testimony concerns economic principles, accounting standards, property valuation or other non-scientific subjects, it should be evaluated by reference to the 'knowledge and experience' of that particular field. To that extent, Daubert ought to be regarded as universally applicable to expert evidence." American College of Trial Lawyers, *Standards and Procedures for Determining the Admissibility of Expert Evidence after Daubert*, 157 F.R.D. 571, 579 (1994).

For the same reasons, this court recently held in *Watkins v. Telsmith, Inc.*, 121 F.3d 984 (5th Cir.1997) that the application of *Daubert* in determining the admissibility of expert testimony is not limited to "scientific knowledge" or "novel" scientific evidence. *Id.* at 989-991. Moreover, in *Watkins*, this court concluded that:

> [W]hether an expert's testimony is based on "scientific, technical or other specialized knowledge," *Daubert* and Rule 702 demand that the district court evaluate the methods, analysis, and principles relied upon in reaching the opinion. The court should ensure that the opinion comports with applicable professional standards outside the courtroom and that it "will have a reliable basis in the knowledge and experience of [the] discipline."

Id. at 991(quoting *Daubert*, 509 U.S. at 592, 113 S.Ct. at 2796.) (also citing and quoting *Cummins v. Lyle Indus.*, 93 F.3d 362, 366-371 (7th Cir.1996)(Rule 702 demands that experts "adhere to the same standards of intellectual rigor that are demanded in their professional work." *Id.* at 369)(citing *Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316, 318 (7th Cir.1996))); *See also Tyus v. Urban Search Management*, 102 F.3d 256, 263 (7th Cir.1996)("Social science testimony . . . must be tested to be sure that the person possesses genuine expertise in a field and that her court testimony 'adheres to the same standards of intellectual rigor that are demanded in [her] professional work.' ")(quoting *Braun v. Lorillard Inc.*, 84 F.3d 230, 234 (7th Cir.1996)).

### d. Relevance: The opinion or inference must be relevant to the case.

Rule 702 further requires that the evidence or testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." This condition goes primarily to relevance. *Daubert*, 509 U.S. at 590, 113 S.Ct. at 2795. " 'Expert testimony which does not relate to any issue in the case is not relevant and, ergo, non-helpful.' 3 WEINSTEIN & BERGER ¶ 702[02], p. 702-18. *See also United States v. Downing*, 753 F.2d 1224, 1242 (3d Cir.1985)('An additional consideration under Rule 702 — and another aspect of relevancy — is whether expert testimony proffered in the case is sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute')." *Id.* at 591, 113 S.Ct. at 2795. "The study of the phases of the moon, for example, may provide valid scientific 'knowledge' about whether a certain night was dark, and if darkness is a fact in issue, the knowledge will assist the trier of fact. However (absent creditable grounds supporting such a link), evidence that the moon was full on a certain night will not assist the trier of fact in determining whether an individual was unusually likely to have behaved irrationally on that night." *Id.*

### e. The trial judge is the gatekeeper.

Accordingly, when faced with a proffer of a qualified expert's testimony to scientific, technical or other specialized knowledge, the trial judge must determine at the outset, pursuant to Rule 104(a), whether the proffered opinion or inference is soundly grounded in the methodology of the expert's discipline and whether that opinion or inference is relevant to a fact in issue or to an understanding of the evidence. *Cf. Daubert*, 509 U.S. at 589-592, 113 S.Ct. at 2794-2796.

The Court emphasized that the trial judge's inquiry under Rule 702 is a flexible one. Different approaches may be permissible, but the focus must be on the principles and methodology upon which the expert's opinion is based, not on the merits of the expert's conclusion. *Id.* at 594-595 n. 12, 113 S.Ct. at 2797-2798. "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." *Id.* at 596, 113 S.Ct. at 2798 (citing *Rock v. Arkansas*, 483 U.S. 44, 61, 107 S.Ct. 2704, 2714, 97 L.Ed.2d 37 (1987)). "Additionally, in the event the trial court concludes that the scintilla of evidence presented supporting a position is insufficient to allow a reasonable juror to conclude that the position more likely than not is true, the court remains free to direct a judgment, Fed. Rule Civ. Proc. 50(a), and likewise to grant summary judgment, Fed. Rule Civ. Proc. 56." *Id.* (citing *cf., e.g., Turpin v. Merrell Dow Pharmaceuticals, Inc.*, 959 F.2d 1349 (6th Cir.), *cert. denied*, 506 U.S. 826, 113 S.Ct. 84, 121 L.Ed.2d 47 (1992); *Brock v. Merrell Dow Pharmaceuticals, Inc.*, 874 F.2d 307 (5th Cir.1989), *modified*, 884 F.2d 166 (5th Cir.1989), *cert. denied*, 494 U.S. 1046, 110 S.Ct. 1511, 108 L.Ed.2d 646 (1990)).

f. The *Daubert* "factors" are hard scientific methods that generally are inappropriate for the reliability assessment of clinical medical testimony.

After declaring that evidentiary reliability of an expert's scientific opinion depends on whether it is soundly grounded in the the scientific method, the *Daubert* Court identified several individual methods or techniques within the body of hard or Newtonian scientific methodology as appropriate for trial judges' use in testing the methodology-relatedness of particular hard scientific opinion proffers. *Daubert*, 509 U.S. at 593, 113 S.Ct. at 2796. These hard scientific methods, now sometimes called "*Daubert* factors," are empirical testing, peer review and publication, known or potential rate of error, the existence and maintenance of operational standards, and acceptance within a relevant scientific community. *Id.* at 593-94, 113 S.Ct. at 2796-2797.

Because the objectives, functions, subject matter and methodology of hard science vary significantly from those of the discipline of clinical medicine, as distinguished from research or laboratory medicine, the hard science techniques or methods that became the "*Daubert* factors" generally are not appropriate for assessing the evidentiary reliability of a proffer of expert clinical medical testimony.

First, the goals of the disciplines of clinical medicine and hard or Newtonian science are different. In hard science, the usual motive is inquiring: to gain a new understanding of some mechanism of nature. Alvan R. Feinstein, *Clinical Judgment* 22 (1967)[hereinafter Feinstein]. In contrast, the care and treatment of the individual patient is the ultimate, specific act that characterizes a clinical physician. *Id.* at 27; Pellegrino and Thomasma, *For The Patient's Good* 71 (1988); Pellegrino and Thomasma, *A Philosophical Basis of Medical Practice* 120 (1981)("[T]he whole process is ordained to a specific practical end — a right action for a particular patient — and . . . this end must modulate each step leading to it in important ways."). The clinical physician, therefore, must take account of the immediacy of the problem confronting her for she bears an essential relationship to each patient. Additionally, she has many human values to consider — ethics, compassion, and must have a willingness to take responsibility in the face of the unknown. Edmond A. Murphy, *The Logic of Medicine* 6 (1976)[hereinafter Murphy]. The pursuit of these different goals of hard science and clinical medicine serves to shape the distinct objectives of the scientific experiment and the clinical treatment of a patient:

> In clinical treatment, the main motives are remedial, or prophylactic: to change what nature has done or to prevent what it may do. In laboratory work, the premise is innovative: the goal is to test a new hypothesis or a new procedure. In ordinary clinical treatment, the premise is repetitive: the goal is to reproduce (or surpass) the best results of experiments conducted before in similar circumstances. A clinician chooses treatment in a new situation by reviewing what was done and what happened in previous situations that resembled the one at hand; he then selects whatever mode of treatment had the most successful outcome in the past. *Id.* at 22.

In ordinary clinical treatment, the purpose is not to gain new knowledge but to repeat a success of the past. *Id.* at 23.

Second, the subject matter and conditions of study are different. "In laboratory work, the experimental material is an intact animal, a part of a person or of an animal, or an inanimate system; in clinical treatment, the material is an intact human being." *Id.* at 22. The hard scientist initiates the experiment at a time of his own convenience and chooses the material usually without regard to its desire or consent for participation. *Id.* In clinical medicine, the patient initiates the treatment, choosing the time, place, duration, and clinician. *Id.* "The physician is not studying the properties of chemical compounds in a test tube; he cannot postpone dealing with cancer in a patient for fifty years because he hopes by then to have a much clearer insight into the nature of the disorder." *Id.*

Finally, clinical medicine and hard science have markedly different methodologies. A clinician observes at least three types of data for each patient who undergoes treatment: A disease in morphologic, chemical, microbiologic, physiologic, or other impersonal terms; the host in whom the disease occurs and his environmental background, including his personal properties (such as age, race, sex, and education) and external surroundings (such as geographic location, occupation, and financial and social status) before the disease began; and the illness that occurs in the interaction between the disease and its environmental host, consisting of clinical phenomena: the host's subjective sensations, or "symptoms," and "signs," which are findings discerned objectively during the physical examination. Feinstein, at 24-25.

Using these data, the clinician determines a present diagnosis (which gives the disease a name and tells what is wrong), a past etiology and pathogenesis (or how it got that way), and a future prognosis and therapy (or what to do about it). *Id.* at 25. Some of the data used by the clinician can often be obtained by examining the patient's fluids, cells, tissues, excreta, roentgenograms, graphic tracings, and other derivative substances. The patient's personal environmental data can often be elicited by nurses, secretaries, social workers, or other interviewers. But the history-taking, physical examination, and the determination of symptoms and signs can properly be done only by a doctor skilled in the clinical procedures described above. *Id.* "Moreover, the [clinical physician's] capacity to make judgments in cases of a kind which he has never seen before must depend ultimately on a cultivated capacity to see equivalences between quite disparate things, that is, on analogy." Murphy, at 9.

In sum, hard or Newtonian scientific knowledge does not comprehend all subjects that theoretically might be subjected to its methodology. It is knowledge of a particular and limited kind, gathered or tested by a particular and characteristic method. T.H. Savory, *The Language of Science* (1953). Although clinical medicine utilizes parts of some hard sciences, clinical medicine and many of its subsidiary fields are not hard sciences. The purposes, criteria, values and methods of hard or Newtonian science and clinical medicine are far from identical. Fred A. Mettler, *The Medical Sourcebook* xxxiv (1959). Consequently, the *Daubert* factors, which are hard scientific methods selected from the body of hard scientific knowledge and methodology generally are not appropriate for use in assessing the relevance and reliability of clinical medical testimony. Instead, the trial court as gatekeeper should determine whether the doctor's proposed testimony as a clinical physician is soundly grounded in the principles and methodology of his field of clinical medicine.[2]

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[2] The *Daubert* factors may be relevant and appropriate, however, in assessing other types of expert evidence outside the realm of hard science. For example, this court and others have recognized the utility of testing as a factor for assessing the reliability of proffered expert engineering testimony in alternative design cases. *Watkins v. Telsmith, Inc.*, 121 F.3d 984 (5th Cir.1997); *Cummins v. Lyle Industries*, 93 F.3d 362 (7th Cir.1996); *Peitzmeier v. Hennessy Industries, Inc.*, 97 F.3d 293 (8th Cir.1996). It is self evident, of course, that an engineer's proffered conclusion as to a feasible alternative design lends itself to verification by controlled testing or experimentation, whereas a medical patient

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B. Rule 703

Rule 703 provides that:

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

Prior to *Daubert*, this court took the position that, before admitting expert testimony, a trial court, as part of or in addition to its preliminary inquiry under Rule 703, must apply the *Frye* test, i.e., the court must determine that the witness used a well-founded methodology or mode of reasoning sufficiently established to have gained general acceptance in the particular field in which it belongs. *Christophersen v. Allied-Signal Corp.*, 939 F.2d 1106, 1110, 1111, 1115 (5th Cir.1991). In *Daubert*, however, the Supreme Court held that the *Frye* "general acceptance" test was displaced by the adoption of the Federal Rules of Evidence. *Daubert*, 509 U.S. at 588-589, 113 S.Ct. at 2793-2794. The court stated that the "general acceptance" test is at odds with the "liberal thrust" of the Federal Rules of Evidence and their "general approach of relaxing the traditional barriers to 'opinion' testimony," and concluded that *Frye* is "incompatible with the Federal Rules of Evidence [and] should

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usually cannot practicably, ethically or humanely be subjected to experimentation under conditions like those believed by a clinical physician to have caused the patient's disease simply to verify the doctor's proffered opinion.

not be applied in federal trials." *Id.* Therefore, any requirement that the trial court apply the *Frye* "general acceptance" test in determining the admissibility of expert testimony under the Federal Rules of Evidence is no longer tenable in light of the Supreme Court's decision in *Daubert* that the test should not be applied in federal trials. Accordingly, we now read the Federal Rules of Evidence, including Rule 703, without the influence of a *Frye*-focal lens.

Under rule 703, a qualified expert may apply his relevant and reliably grounded knowledge and expertise to facts and data in the particular case in order to form and express a pertinent opinion or inference. The facts or data may be derived from (1) the first hand observation of facts, data, or opinions perceived by the witness before trial, (2) the facts, data or opinions presented at trial (as by the familiar hypothetical question or by having the expert attend the trial and hear the testimony establishing the facts, data, and opinions relied on), or (3) facts, data or opinions presented to the expert outside of court other than by his own direct perception. Fed.R.Evid. 703 advisory committee's note. If they are of a type reasonably relied upon by experts in the field, such facts, data or opinions presented to the expert out of court need not be admitted or even admissible in evidence. *United States v. Harper*, 802 F.2d 115, 121 (5th Cir.1986). The rule is designed to bring the judicial practice into line with the practice of experts themselves when not in court. *United States v. Williams*, 447 F.2d 1285, 1290 (5th Cir.1971), *cert. denied*, 405 U.S. 954, 92 S.Ct. 1168, 31 L.Ed.2d 231 (1972), *reh'g denied*, 405 U.S. 1048, 92 S.Ct. 1308, 31 L.Ed.2d 591 (1972). The Advisory Committee Note accompanying Rule 703, in part, states:

> Thus a physician in his own practice bases his diagnosis on information from numerous sources

> and of considerable variety, including statements by patients and relatives, reports and opinions from nurses, technicians and other doctors, hospital records, and X rays. Most of them are admissible in evidence, but only with the expenditure of substantial time in producing and examining various authenticating witnesses. The physician makes life-and-death decisions in reliance upon them. His validation, expertly performed and subject to cross-examination, ought to suffice for judicial purposes.

*See also United States v. Burrell*, 505 F.2d 904 (5th Cir.1974); *United States v. Williams*, 447 2d. at 1290.

The question of whether facts, data or opinions not admitted in evidence are of a type reasonably relied upon is a preliminary one for the court. *Bauman v. Centex Corp.*, 611 F.2d 1115 (5th Cir.1980); *United States v. Lawson*, 653 F.2d 299 (7th Cir.1981), *cert. denied*, 454 U.S. 1150, 102 S.Ct. 1017, 71 L.Ed.2d 305 (1982); Michael H. Graham, HANDBOOK OF FEDERAL EVIDENCE § 703.1 (4th Ed.1996). Although only the terms "facts or data" appear in Rule 703, an opinion not in evidence, even if not admissible, may also form the basis of an expert's opinion if reasonably relied upon by experts in the particular field. *See* Graham, at p. 109-110, n. 18 (citing the Advisory Committee Note to Rule 703). In determining the preliminary question of whether reliance by the expert is reasonable, the party calling the witness must satisfy the court, both that such facts, data or opinions are of the type customarily relied upon by experts in the field and that such reliance is reasonable. *See Christophersen v. Allied-Signal, Corp.*, 939 F.2d 1106, 1113-1114 (5th Cir.1991) (en banc); *Bryan v. John Bean Div. of FMC Corp.* 566 F.2d 541, 544-47 (5th Cir.1978). *But see Peteet v.*

*Dow Chemical Co.* 868 F.2d 1428, 1432 (5th Cir.1989), *cert. denied*, 493 U.S. 935, 110 S.Ct. 328, 107 L.Ed.2d 318 (1989) (in making the 703 determination, "the trial court should defer to the expert's opinion of what data they find reasonably reliable."); *See also*, 3 Weinstein's Evidence ¶ 703[03] at 703-17(1981).

*Daubert's* description of the trial judge's duty as gatekeeper under Rule 702 sheds light on her duty in this capacity under Rule 703 and the relationship between these duties. The trial judge's duty under Rule 702 is to determine whether the expert is qualified; whether his proffered opinion is grounded in the methodology of his discipline, i.e., the body of principles, methods, rules and postulates of his field of expertise; and whether his opinion is relevant to the case. In *Daubert*, the Supreme Court stated that a judge assessing a proffer must also pay attention to Rule 703, which "provides that expert opinions based on otherwise inadmissible hearsay are to be admitted only if the facts or data are 'of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.' " *Daubert*, 509 U.S. at 595, 113 S.Ct. at 2797. Accordingly, the trial judge as gatekeeper has a duty under Rule 703 to determine whether such facts and data not admitted in evidence are of the type customarily relied upon by experts in the field and whether such reliance is reasonable.

Therefore, it may be inferred that the duties of a judicial gatekeeper in assessing an expert opinion under Rules 702 and 703 are roughly similar to those of an appellate court in reviewing the combined legal and factual decisions of a trial judge. This is because the expert and the trial judge perform similar functions in applying specialized knowledge to facts to reach a conclusion or decision about an issue in a case.

Consequently, the appellate court and the gatekeeper also perform similar functions in reviewing the work of the trial court and the expert to determine whether their conclusions are soundly grounded in the correct principles of knowledge and are based on properly and reasonably found facts and data.

### C. Rule 403

Rule 403 provides that:

> Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

The Supreme Court in *Daubert* admonished that a judge performing her gatekeeping duties under Rule 702 should also be mindful of other applicable rules, including Rule 403. *Daubert*, 509 U.S. at 595, 113 S.Ct. at 2797. The court stated that "Rule 403 permits the exclusion of relevant evidence 'if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury. . . .' " *Id.* The court quoted Judge Weinstein as explaining: " 'Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403 of the present rules exercises more control over experts than over lay witnesses.' *Weinstein*, 138 F.R.D., at 632." 509 U.S. at 595, 113 S.Ct. at 2797.

As Rule 403 favors the admissibility of relevant evidence, such evidence is to be excluded only if its probative value is substantially outweighed by the danger of unfair prejudice. *United States v. Davis*, 639 F.2d 239, 244 (5th Cir.1981); See 22 Wright & Graham, FEDERAL PRACTICE AND PROCEDURE: EVIDENCE § 5221. Moreover, Rule 403 is an extraordinary remedy to be used sparingly because it permits the trial court to exclude otherwise relevant evidence. *E.g.*, *United States v. Thevis*, 665 F.2d 616, 633, (5th Cir. Unit B), *cert. denied*, 456 U.S. 1008, 102 S.Ct. 2300, 73 L.Ed.2d 1303 (1982). There must be a danger of *unfair* prejudice, not merely the danger of prejudice inherent in any relevant evidence; and its probative value must be *substantially* outweighed by that danger. As this court stated in *United States v. McRae*, 593 F.2d 700, 707 (5th Cir.), *cert denied*, 444 U.S. 862, 100 S.Ct. 128, 62 L.Ed.2d 83 (1979):

> Relevant evidence is inherently prejudicial; but it is only *unfair* prejudice, *substantially* outweighing probative values, which permits exclusion of relevant matter under Rule 403. Unless trials are to be conducted on scenarios, on unreal factors tailored and sanitized for the occasion, the application of Rule 403 must be cautious and sparing. Its major function is limited to excluding matter of scant or cumulative probative force, dragged in by the heels for the sake of its prejudicial effect. As to such, Rule 403 is meant to relax the iron rule of relevance, to permit the trial judge to preserve the fairness of the proceedings by exclusion despite its relevance. It is not designed to permit the court to " 'even out' the weight of the evidence, to mitigate a crime, or to make a contest where there is little or none." (emphasis in original)

"Virtually all evidence is prejudicial or it isn't material. The prejudice must be 'unfair.' " *Dollar v. Long Mfg. N.C., Inc.*, 561 F.2d 613, 618 (5th Cir.1977), *cert. denied*, 435 U.S. 996, 98 S.Ct. 1648, 56 L.Ed.2d 85 (1978). The Advisory Committee Note on Rule 403 provides that "[u]nfair prejudice within this context means an undue tendency to suggest decision on an improper basis, commonly, though not necessarily, an emotional one." For example, evidence may be unfairly prejudicial because it appeals to the jury's sympathies, arouses its sense of horror, provokes its instinct to punish, triggers other mainsprings of human action, or may cause a jury to base its decision on something other than the established propositions of the case. 3 WEINSTEIN & BERGER ¶ 403[03] 403-37 to 403-40 (*citing* authorities including *United States v. Bowers*, 660 F.2d 527 (5th Cir.1981); *United States v. Osum*, 943 F.2d 1394, 1404 (5th Cir.1991); *United States v. Kang*, 934 F.2d 621, 628 (5th Cir.1991)). In addition, evidence may threaten "confusion of the issues, or misleading the jury" when "the probability that the proof and the answering evidence that it provokes may create a side issue that will unduly distract the jury from the main issues." McCormick, MCCORMICK ON EVIDENCE § 185(West 2d ed.1972); *See Ford v. Sharp*, 758 F.2d 1018 (5th Cir.1985).

## III. Background Facts

On April 23, 1990, Bob T. Moore, a delivery truck driver for Consolidated Freightways, Inc., a motor freight company, delivered a shipment of solvents containing mixed chemicals to Ashland Chemical, Inc. Bart Graves, Ashland's plant manager was on the loading dock when Moore arrived. When the back door of the trailer opened, chemical gases were escaping from two leaking drums. Graves notified Dow Corning

Corporation, the manufacturer and shipper of the chemical solvents, of the spill and requested clean up instructions. At Graves' request, Dow Corning faxed him a copy of the Material Safety Data Sheet ("MSDS") regarding the spilled chemical solvents. The MSDS notified Graves of the nature of the chemical contents in the solvents and the health problems associated with exposure to the chemical mixture's vapors.[3]

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[3] The MSDS that Dow Corning faxed to Graves stated, in part:

* * * * * *

Section II-HAZARDOUS INGREDIENTS AS DEFINED IN 29 CFR 1910.1200

* * * * * *

TOLUENE . . .

SOLVENT NAPHTHA, PETROLEUM, LIGHT ALIPHATIC . . .

ISOBUTYLISOBUTYRATE . . .

PROPYLENE GLYCOL METHYL ETHER . . .

Section III-EFFECTS OF OVEREXPOSURE:

ZA

Inhalation: Short vapor exposure may cause drowsiness and irritate nose and throat. Vapors may injure blood, liver, lungs, kidneys, and nervous system. Degree of effects depends on concentration and length of exposure.

(Cont'd)

Significantly, the MSDS stated that the solvents contained a blend of chemicals, including toluene, naphtha, and propylene glycol methyl ether. It warned that inhalation of their vapors could result in injury to the blood, liver, lungs, kidneys, and nervous system. To prevent such injuries, the MSDS cautioned that, in the event of a spill, respiratory protection equipment should be worn unless there is adequate ventilation, or the level of contaminants was below a specified level.

Moore was not shown or informed of the contents of the MSDS.

Moore's rig consisted of a diesel tractor and a 28 foot enclosed trailer. Ventilation in the trailer was limited. Moore told Graves that he wanted to return to Consolidated

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(Cont'd)

* * * * * *

> Comments: Prolonged Toluene overexposure may injure blood, liver, lungs, kidneys, and nervous system and may aggravate existing eye, skin, and respiratory disorders.

* * * * * *

> Section VIII-SPILL, LEAK, MAINTENANCE/REPAIR AND DISPOSAL PROCEDURES:

* * * * * *

> Inhalation: Use respiratory protection unless local exhaust ventilation is adequate or air sampling data show exposures are within TLV and PEL guidelines.

* * * * * *

Freightways and have other employees clean it out. Graves told Moore, however, that the bill of lading would not be signed until after the spill in the trailer was cleaned up. Moore telephoned his supervisor who told Moore to comply with Ashland's demands regarding the spill clean up. Graves directed Moore to clean up the trailer by placing absorbent material on the chemicals, sweeping them up, and disposing of them in "overpacks" to be placed in the leaking drums.

During the clean up, Moore informed Graves of his recent recovery from pneumonia and requested the use of a respirator to which Graves had access. Graves refused, despite his knowledge of the lack of ventilation in the trailer. Graves also failed to measure the amount of contaminants in the trailer, although he had access to a meter provided by Ashland for this purpose. The clean up job took between 45 minutes and an hour. Within an hour or so after cleaning up the spill, Moore began to suffer dizziness, watery eyes, and difficulty in breathing.

When he returned to Consolidated Freightways, Moore informed his supervisor that he was sick and he was sent to the company doctor. The next day, Moore saw his family physician, who treated him for two to three weeks. Moore then placed himself under the care of Dr. Simi, a pulmonary specialist. Dr. Simi prescribed medication for Moore and released him to work. Moore returned to work during June 1990, but terminated his employment a few weeks later because of his respiratory difficulties.

On June 26, 1990 and subsequently, Moore was seen by Dr. Daniel Jenkins, a pulmonary, environmental and internal medicine specialist. After seeing Moore three times in June, July and August 1990, Dr. Jenkins diagnosed Moore's condition as reactive airways dysfunction syndrome ("RADS"). On November 29, 1990, Moore was seen by Dr. Antonio Alvarez, a pulmonary and internal medicine specialist, who became his treating physician. Dr. Alvarez confirmed and adopted Dr. Jenkins' diagnosis and treated Moore for his disease up to and during the trial. By this time, Moore's condition had deteriorated, he was still unable to work, and he was forced to carry a container of oxygen at all times.

## IV. Moore's Proffers of Expert Clinical Medical Testimony

The plaintiffs set out to prove that Moore's personal injury, viz., his reactive airways disease, was proximately caused by his exposure to the mixture of chemicals he encountered at Ashland's premises. Moore's case depended on expert testimony that his disease was reactive airways disease and that it had been caused by his exposure to the chemicals at Ashland. The plaintiffs proffered the opinions and inferences of Dr. Daniel E. Jenkins and Dr. B. Antonio Alvarez based on their clinical medical knowledge and facts and data in this particular case for these purposes.

### A. Dr. Jenkins

Dr. Jenkins received his medical degree from the University of Texas in 1940. He received medical training at the University of Michigan Hospital as an intern, resident in medicine, resident in Tuberculosis and Chest Disease, and resident in Allergy in 1940-1945. The American Board of Internal Medicine certified him in 1947. Between 1943 and 1947 he served as Instructor and Chief Resident in Medicine and as Assistant Professor of

Medicine and Physician in charge of the Tuberculosis and Chest Unit, University of Michigan Medical School. From 1947 to 1991 he served as Assistant Professor, Associate Professor, and Professor of Medicine at Baylor College of Medicine, Houston, Texas. From 1947 to 1974 he was Chief, Pulmonary Disease Section, Baylor College of Medicine. From 1975 to 1991 he was Chief, Environmental Medicine, Baylor College of Medicine. In 1991, he went into practice with The Respiratory Consultants of Houston, consisting mostly of a group of physicians that he had trained. He is either Attending Physician or Consultant in Medicine or Pulmonary Medicine at eight Hospitals in Houston, Texas. Additionally, Dr. Jenkins is a member of sixteen national, state and local medical organizations and has served as president or chairman of a section for three of them.

In formulating his opinion, Dr. Jenkins personally took a detailed medical history from Moore, performed a thorough physical examination, personally observed him three times, performed or supervised a series of tests on Moore including pulmonary function tests, a bronchial challenge test, a bronchodilator test, a spirometry test, a plethysmographic test, a lung volume determination, an intrapul gas distribution test, a diffusion test, an arterial bloods test, a mechanics test, X-rays, and laboratory tests, reviewed the medical records and reports of Dr. Alvarez and Dr. Simi, including a report of the bronchial dilator test by Dr. Simi two or three weeks after the accident that showed severe airways obstruction and a report of an allergy test performed by Dr. Alvarez — among some fifteen reports of examinations and tests by him — that ruled out allergic or immunologic disease and confirmed reactive airways disease as the proper diagnosis of Moore's illness, reviewed the material safety data sheet "MSDS" prepared by

Dow Corning, and consulted a medical treatise, Carl Zenz, OCCUPATIONAL MEDICINE: PRINCIPLES AND PRACTICAL APPLICATION (2d ed.1988) and other medical literature.

In his proffered testimony, Dr. Jenkins explained that reactive airways disease, also known as reactive airways dysfunction syndrome (RADS), is recognized in the field of clinical medical knowledge as a disorder consisting of a reactive obstruction of air passageways in the bronchial trees and the lower respiratory tract, producing labored breathing, wheezing, shortness of breath, coughing and the raising of phlegm. Dr. Jenkins' testimony as to the nature and symptoms of reactive airways disease was accepted as accurate by the parties and other experts on both sides. In the history taken by Dr. Jenkins, Moore reported that he had been in comparatively good health until about one hour after his exposure to the chemical gases at Ashland when he began to experience these types of symptoms. In his physical examinations and tests of Moore, Dr. Jenkins observed symptoms and signs of reactive airways disease. Dr. Jenkins stated that the objective medical tests performed by him and the several doctors who had seen Moore after his exposure indicated conclusively that Moore was not malingering.

Dr. Jenkins offered his opinion that Moore suffered from reactive airways disease that had been caused by Moore's exposure to gases emanating from a spill of blended chemicals which Moore had cleaned up without a respirator. He testified that the manufacturer's material safety data sheet stated that the principal substances contained in the mixture of chemicals that Moore breathed were toluene, naphtha, and propylene glycol methyl ether, and that all of these have irritating properties. He further stated that any chemical with irritating properties can cause reactive airways disease in a person who is capable of responding in that way. Dr. Jenkins also stated that toluene, one of the chemicals to which Moore was exposed, is similar to the chemical nature of other properties upon which there have been written articles on reactive airways disease. Dr. Jenkins testified that, based on the history given by Moore that a substantial amount of the mixed chemical solvent had leaked onto the truck-trailer floor from two 55 gallon drums while the cargo was enclosed and en route, he roughly estimated that Moore had been exposed to 200 parts per million or higher of the chemical vapors. Dr. Jenkins also testified that Moore informed him that neither Ashland nor anyone else had taken air samples with mechanical devices at the time of Moore's exposure.

Although Dr. Jenkins acknowledged that he could not recall having seen a patient who had been exposed to the same chemicals under the same circumstances, he testified that he had examined and evaluated over one hundred other patients who had been exposed to chemicals under various circumstances. During Dr. Jenkins' deposition, the interrogating lawyers and the doctor sometimes referred to the mixed chemical spillage as "toluene," which was in fact just one of its many ingredients. But a fair reading of the deposition as a whole clearly indicates that when the lawyers and Dr. Jenkins used the word "toluene" they intended to refer to the chemical mixture containing toluene and simply called the solvent mixture "toluene" for the sake of convenience. Dr. Jenkins' proffered testimony was that, based on his education, knowledge, training, and experience, personal examination of Moore, personal taking of Moore's history, supervision and study of his own tests on Moore, review and study of other doctors' reports, tests and opinions, study of a medical treatise and numerous medical literature articles, he concluded that Moore's exposure to the mixture of chemical gases contained in the solvent to which he was exposed caused his disease, because any chemical with irritating properties can cause reactive airways disease, and each of the chemicals in the solvent mixture had irritating properties.

B. Dr. Alvarez

Dr. Alvarez testified that he was born in Mexico and came to the United States in 1964 for internship and residency in internal medicine, followed by two years of fellowship in pulmonary at the Baylor College of Medicine in Houston. Dr. Daniel E. Jenkins was one of Dr. Alvarez's professors at the Baylor College of Medicine. Dr. Alvarez had practiced in Houston since 1973 and was on the active staff of three, and courtesy staff of one, Houston area hospitals.

At the proffer stage, Dr. Alvarez, offered his opinion based on clinical medical knowledge as an internist and pulmonary specialist, enhanced by his experience in having seen fifty to sixty patients injured from exposure to chemicals, and on the facts and data contained in the medical history taken by Dr. Jenkins, the X-rays and numerous medical tests performed by Dr. Jenkins, a sinus X-ray, an allergy or RAST test performed by Dr. Alvarez tending to rule out allergies as the cause of the illness, numerous physical examinations and observations of Moore, and the manufacturer's material data sheet pertaining to the chemicals to which Moore was exposed. Applying his knowledge, education, training and experience to these facts and data, but admittedly relying heavily on Dr. Jenkins' work and opinion, Dr. Alvarez expressed his opinion that Moore suffered from reactive airways disease that had been caused by his inhalation of chemical gases while he was cleaning up the chemical spillage at Ashland. When asked whether he relied heavily on the evaluation and documentation provided from Dr. Jenkins, Dr. Alvarez replied "very much." In addition, he testified that he had not seen the history and evaluations of Dr. Warren Simi first hand. Dr. Alvarez was asked how important it was to know the duration of an exposure, the amount of chemical present, the dimensions of the area or enclosure, the ventilation, and the temperature. In response, Dr. Alvarez indicated that if such data were available it would be very important, but, he explained, it is always very difficult for a medical doctor, who must make decisions as to causation and diagnosis in treating patients accidentally exposed to chemicals or other toxic substances, to obtain exact or mechanically measured data on these issues because of the very fact that the injury always results from an accident and not a controlled experiment.

### C. Dr. Jenkins' opinion as to causation was soundly grounded in traditional clinical medical knowledge, principles and methodology.

Dr. Jenkins, a specialist in pulmonary and environmental disease, based his opinion on principles, theories, methodology and techniques, which are well accepted within his discipline. In summary, the proffered testimony of Dr. Jenkins reflects that he: 1) Examined Moore personally: Dr. Jenkins saw Moore on three occasions, between June 26, and August 1, 1990. On each occasion the doctor personally observed the patient. The doctor performed a thorough physical examination of Moore. (Personal observation has always been an adequate basis for an expert's opinion, and indeed has been called " 'the most desirable of all bases.' " 3 WEINSTEIN ¶ 703[01], 703-7;

Rheingold, *The Basis of Medical Testimony*, 15 VAND.L.REV. 473, 489 (1962)). 2) Personally took a detailed medical history from Moore: Dr. Jenkins personally took Moore's history involving his health and the accident in an interview of approximately one and one-half hours. ("Reliance on patient statements to render a medical opinion is usually justified as trustworthy because patients have a strong incentive to tell their treating physician the truth — the desire to recover." *In re Agent Orange Product Liability Litigation*, 611 F.Supp. 1223, 1246 (E.D.N.Y.1985); Rheingold, *supra* at 495; *Ferebee v. Chevron Chemical Co.*, 736 F.2d 1529, 1535 (D.C.Cir.1984)(especially when corroborated by medical records, physical examination, and medical tests); *See O'Gee v. Dobbs Houses, Inc.*, 570 F.2d 1084 (2d Cir.1978); *Birdsell v. United States*, 346 F.2d 775, 780 (5th Cir.1965); Rheingold, *supra* at 488.) 3) Used Differential Diagnosis and Etiology: In his determination of the cause and nature of the disease, Dr. Jenkins performed or supervised a series of tests on Moore. He studied, compared and synthesized the results so as to eliminate all possibilities but the most likely diagnosis and cause of the disorder. The gamut of tests performed on Moore included pulmonary function tests, a bronchial challenge test, a bronchodilator test, an allergy test, X-rays, and laboratory tests. Dr. Jenkins and Dr. Alvarez testified that it would have been impossible for Moore to fake RAD signs on the objective tests. *See Birdsell v. United States*, 346 F.2d 775, 779-780 (5th Cir.1965) ("[T]he physician making a diagnosis must necessarily rely on many observations and tests performed by others and recorded by them; records sufficient for diagnosis in the hospital ought to be enough for opinion testimony in the courtroom."; *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038, 1043-1044 (2nd Cir.1995); *Benedi v. McNeil-P.P.C., Inc.*, 66 F.3d 1378, 1384 (4th Cir.1995)). 4) Reviewed tests, reports and opinions of other doctors: Dr. Jenkins reviewed the records and reports of Dr. Simi, who had seen Moore shortly after the accident. Dr. Jenkins testified that Dr. Simi's records showed even more severe airways obstruction in response to bronchial dilators which indicated there was not any question that Moore had acquired reactive airways disease. Dr. Jenkins also stated that he had reviewed the allergy studies performed by Dr. Alvarez that confirmed the reactive airways disease diagnosis and ruled out an allergic or immunologic disease as the cause. (Reliance on reports and observations of other physicians and medical technicians is accepted practice in medical field and may be relied on by expert witnesses. *Jenkins v. United States*, 307 F.2d 637 (D.C.Cir.1962)). 5) Reviewed the MSDS: The Occupational Safety and Health Act authorizes the Secretary to promulgate safety and health standards and requires employers to comply with them. 29 U.S.C. §§ 654(a)(2), 655. Pursuant thereto, the Hazard Communication Standard, 29 C.F.R. § 1910.1200, requires that a manufacturer of hazardous chemicals inform its own employees and downstream employers and employees of the dangers posed by the chemicals. The manufacturer is required to prepare a material safety data sheet (MSDS) for each hazardous chemical, including the identity of the chemical; health hazards posed; and handling precautions. *See Martin v. American Cyanamid Co.*, 5 F.3d 140 (6th Cir.1993) Dr. Jenkins and Dr. Alvarez reviewed the MSDS that Dow Corning provided with the chemicals to which Moore was exposed. The MSDS is a type of fact or data reasonably relied upon by medical experts in forming opinions or inferences as to medical causation. *See McCullock v. H.B. Fuller Company*, 61 F.3d 1038, 1044 (2d Cir.1995). Because federal regulations require manufacturers to truthfully disclose in the MSDS the identity and health hazards of materials, it is reasonable for medical experts to rely at least in part on the MSDS in forming diagnostic and causal opinions. *See also Peteet v. Dow Chemical Co.*, 868 F.2d 1428, 1432 (5th Cir.1989)("In making this determination, the trial court should defer to the expert's opinion of what data they find reasonably reliable.") 6) Referred to medical literature on the properties of irritant chemicals that cause RAD: Dr. Jenkins relied on a medical treatise, Carl Zenz, OCCUPATIONAL MEDICINE: PRINCIPLES AND PRACTICAL APPLICATION (2d Ed.1988), and a number of published articles in medical literature in forming his opinion or inference that the chemicals to which Moore was exposed were irritants that caused Moore's RAD. ("Facts or data found in the literature of the profession, even though not themselves admissible in evidence, properly form a part of the basis for an expert's opinion." *Bauman v. Centex Corporation*, 611 F.2d 1115, 1120, n. 6 (5th Cir.1980) (*quoting Nanda v. Ford Motor Co.* 509 F.2d 213, 222 (7th Cir.1974))). 7) Utilized his training and experience: During his 53 years of medical practice, Dr. Jenkins had a considerable amount of experience with injuries caused by occupational inhalants. Due to the chemical industries along the Gulf Coast, inhalant disease victims were a large part of the patients seen by the Pulmonary and Environmental Medicine sections that Dr. Jenkins headed at Baylor College of Medicine at Houston, Texas for a combined period of 43 years. Dr. Jenkins had been called upon to make a determination whether a particular condition was caused by a particular chemical on more than one hundred occasions. (A witness's training and long experience may qualify him as an expert and enable him to assist the jury regarding subjects within his training and experience. *United States v. Chappell*, 6 3d. 1095, 1100 (5th Cir.1993); *United States v. Hernandez-Palacios*, 838 F.2d 1346, 1350 (5th Cir.1988); *West Wind Africa Line, Ltd. v. Corpus Christi Marine Services Co.*, 834 F.2d 1232, 1236 (5th Cir.1988)).

## V. Trial Court's Rulings

The defendants moved in limine to exclude the testimony of both Dr. Jenkins and Dr. Alvarez. After the pre-trial in limine hearing, the trial court admitted the testimony of Dr. Jenkins as to diagnosis and that of Dr. Alvarez as to both the diagnosis and the cause of Moore's disease. At that hearing, however, the trial court apparently did not reach a final decision with respect to the proffered testimony of Dr. Jenkins as to cause of disease. The trial court's sketchy oral remarks indicate that a ruling was withheld pending the presentation of further testimony by Dr. Jenkins to explain his deposition and affidavit that plaintiffs had filed in opposition to the defendants-appellees' motion in limine. On a later date during a break in the trial, while the jury was out, the court heard additional testimony by Dr. Jenkins and ultimately decided to exclude his testimony with respect to the cause of Moore's disease. The court gave only very brief oral reasons for its ruling.

The pre-trial in limine hearing consisted of arguments by counsel, interspersed with the court's questions and the attorneys' colloquies with the bench, suggesting but not clearly defining the reasons for the court's inclination to exclude Dr. Jenkins' testimony as to cause of disease. The court clearly concluded that Dr. Jenkins was qualified as an expert and could testify as to his diagnosis and treatment of Moore. R. Vol. 6 at 27. But the court stated that it could not determine whether Dr. Jenkins had probative and reliable underlying evidence from which to infer a causal link between the exposure and the disease. *Id.*

During the pre-trial in limine hearing the court was confused as to whether Moore had been exposed to a single chemical, toluene, or to a mixture of several chemicals, one of which was toluene. At this point, the court apparently did not have a full understanding of Dr. Jenkins' deposition or the contents of the chemical mixture disclosed by the manufacturer's MSDS. In response to the court's question, plaintiffs' counsel stated, and defendants-appellees' attorneys tacitly agreed, that Moore was exposed to a mixture of chemical gases, including, but not limited to, toluene. *Id.* at 23-24. Also, one of the defendants-appellees' attorneys told the court that the chemical mixture contained "propylene glycol methyl ether, toluene, and naphtha."[4] *Id.* at 23. When informed by plaintiffs' counsel that Dr. Jenkins stated in his affidavit and in his deposition that the mixture of chemical irritants caused Moore's reactive airways disease, the court agreed except for stating that it was not sure that Dr. Jenkins had so stated in his deposition. *Id.* at 28. Dr. Jenkins had, in fact, testified in his deposition that Moore was exposed to the mixture of chemicals listed in the Manufacturer's MSDS. During the deposition, the attorneys had sewn seeds of confusion, however, by referring frequently to the whole mixture incorrectly as "toluene," sacrificing accuracy for the sake of brevity. Despite the agreement and understanding of counsel at the pre-trial in limine hearing that Moore was exposed to a mixture of chemicals, the court continued to labor under confusion.

Later, focusing on Dr. Jenkins' affidavit, the court stated "I don't know where he got that information. I don't know whether the chemical irritants he's discussing include toluene. I don't know whether you need to have some significant level of exposure to toluene." Shortly thereafter, the court concluded the hearing as to Dr. Jenkins' testimony, stating "[a]s the motion in limine, Defendant's motion is granted if — I mean, the Defendants, I believe, have put you on notice that they want to explore the basis for this. So that's — He can't just say its generally accepted, blah, blah, blah. . . .He doesn't know where that information is derived. . . .I can't assess it because I haven't heard what it is." *Id.* at 30. From this and later events, we conclude that the court was inclined to grant the defendant-appellees' motion in part but withheld its ruling to permit the plaintiffs to put on additional proffer testimony as to the basis of Dr. Jenkins' causation opinion.

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[4] Footnote number 3 of the dissenting opinion quotes from this passage in an attempt to show that the *trial court* was not confused as to whether the chemical mixture contained chemicals other that toluene. This excerpt merely shows that the *attorneys* and *experts* were not confused. A fair reading of the whole record indicates that the trial court vacillated in its understanding of the nature of the chemicals involved.

Without interruption in the pretrial hearing, the court turned to the proffer of Dr. Alvarez as both a diagnosis and causation witness. The court immediately made clear that it did not consider the proffer of Dr. Alvarez's causation testimony to be fatally flawed by the lack of exact information as to the duration of exposure, the amount and identity of the chemical, the dimension of the area, or the ventilation of the area. In response to defendants-appellees' argument to the contrary, the court asked: "Why doesn't that go to credibility?" *Id.* at 32. Later, the court said that arguments as to "the importance of the exposure and the like" will go to the weight of Dr. Alverez's testimony rather than to its admissibility. *Id.* at 37. Still later, the court observed, "there's nothing before me that indicates that exposure levels are dispositive of such a causal link. There's merely evidence that it's an important factor." *Id.* at 38.

After hearing arguments, the trial court concluded that Dr. Alvarez could testify as to his opinion that Moore's exposure to the chemicals caused his reactive airways disease, because: He testified that reactive airways disease is closely related to asthmatic conditions, pneumochemical exposures, and the like. His deposition laid the groundwork for an opinion that toluene can be the cause of reactive airways disease. He made a broad assertion of studies, findings, generally accepted medical data, and the like. He had a number of statements and opinions in his deposition that were quite different and distinguishable from Doctor Jenkins. "For instance, the RAST testing which showed that it wasn't an allergic condition which lent credibility to an opinion, it was a chemical exposure, those sorts of things." *Id.* at 37-38. In conclusion, the court stated, "Doctor Alvarez can indeed testify. . . .I do believe he testified to matters other than a speculative causal link in that he tied it to the testing that eliminated an allergic cause, et cetera." *Id.* at 54.

On a later date, during a recess of the trial, while the jury was out, the trial court permitted plaintiffs to present the live testimony of Dr. Jenkins in support of their proffer of his expert opinion as to cause of disease. Previously, at the commencement of the trial, the manufacturer's MSDS, which clearly listed the various chemicals in the mixture to which Moore had been exposed, had been introduced as plaintiffs' exhibit no. 16 without objection. Nevertheless, the trial court continued to be plagued by confusion as to the nature of the chemicals involved and its failure to understand that Dr. Jenkins' opinion was based on the fact that Moore had been exposed to the whole mixture of irritating chemicals and not just to the chemical toluene. Dr. Jenkins testified again that, in his opinion, based on his examinations, history taking, and testing of Moore, and the MSDS, the cause of Moore's airways disease was his inhalation of the mixture of chemical substances to which he was exposed; that the principal chemicals in the mixture with irritating properties were toluene, naphtha, and propylene glycol methyl ether; that any chemical with irritating properties can cause reactive airways disease in a subject who is capable of responding in that way; that Moore had a reactive airways predisposition or inheritance; that the absence of an article saying that toluene causes the disease is not determinative because many substances cause the disease that have not yet been addressed in published articles; and that toluene is similar to the chemical nature of other properties causing the disease about which articles have been published.

At the conclusion of Dr. Jenkins' testimony, the trial court stated, "I don't think this meets the 702 test . . . .for a number of reasons." Still hampered by an incomplete understanding of Dr. Jenkins' deposition, the court stated that "when asked if there was any scientific support for a diagnosis of causation between exposure to toluene and reactive airways disease, he had no such literature or research to back up such causation determination." R. Vol. 10 at 154. The court, also misunderstanding Dr. Jenkins' live testimony, stated that "[t]oday he said nothing other than he relied upon the MSDS, which listed a number of other chemicals, and from that stated that some of these other chemicals are known to lead to reactive airways disease, ergo his conclusion that toluene leads to reactive airways disease." *Id.* Further, the court again misconstrued Dr. Jenkins live testimony, stating that his testimony was not necessary because "his entire causation testimony is based upon the MSDS," which, "is in evidence." *Id.* at 155. Also, the court gave as a reason for its ruling the fact that Dr. Jenkins had no scientifically exact information concerning "the level of exposure, amount of exposure, and duration of exposure." Finally, in its remarks pertaining to its Rule 702 ruling, the court stated that Dr. Jenkins had acknowledged that he was not familiar with what type of research techniques the manufacturer used to determine and articulate the warnings of dangers from exposure to the chemical mixture that the manufacturer placed in the MSDS. *Id.* at 156. Alternatively, the court excluded Dr. Jenkins' testimony as to causation under Rule 403 because "it would be highly prejudicial and misleading to have the jury accept from Dr. Jenkins' history and credentials that his opinion as to causation is other than scientific speculation, because that's what I heard him testify to." *Id.* at 155.

## VI. Standards Of Review

The general rule is that the trial court has broad discretion in the matter of admission or exclusion of expert evidence, and its action is to be sustained unless manifestly erroneous. *Salem v. United States Lines Co.*, 370 U.S. 31, 82 S.Ct. 1119, 8 L.Ed.2d 313 (1962); *Congress & Empire Spring Co. v. Edgar*, 99 U.S. 645, 658, 25 L.Ed. 487 (1878); *Guillory v. Domtar Industries, Inc.*, 95 F.3d 1320, 1329 (5th Cir.1996); *United States v. Moore*, 997 F.2d 55 (5th Cir.1993); *Carroll v. Morgan*, 17 F.3d 787 (5th Cir.1994); *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038 (2d Cir.1995). However, we have held that even though the trial court's discretion to admit or exclude evidence is generally broad, competent evidence cannot be excluded without a sound and acceptable reason. *Equal Employment Opportunity Commission v. Manville Sales Corp.*, 27 F.3d 1089, 1092 (5th Cir.1994); *Davidson Oil Country Supply Co. v. Klockner, Inc.*, 908 F.2d 1238, 1245 (1990).

Moreover, the Supreme Court has indicated that the trial court's determination of preliminary questions of facts concerning the admissibility of evidence under Rule 104(a) should be reviewed by the clearly erroneous standard. *Bourjaily v. United States*, 483 U.S. 171, 181, 107 S.Ct. 2775, 2781, 97 L.Ed.2d 144 (1987); See 2 Childress & Davis, FEDERAL STANDARDS OF REVIEW, § 11.04, p. 11-22 (2d Ed.1992). In *Daubert*, the Supreme Court reaffirmed *Bourjaily*, citing it in stating that proof of such facts should be established by a preponderance of proof. *Daubert*, 509 U.S. at 592 n. 10, 113 S.Ct. at 2796 n. 10 (citing *Bourjaily*, 483 U.S. at 175-176, 107 S.Ct. at 2778-2779). Regarding the clearly erroneous standard, this court and a substantial number of the other courts of appeal have held that mixed questions of law and fact, legal inferences from the facts, or the application of law to the facts are not protected by the clearly erroneous rule and are freely reviewable. *United States v. LULAC*, 793 F.2d 636, 642 (5th Cir.1986); *Carpenters Amended & Restated Health Benefit Fund v. Holleman*, 751 F.2d 763, 767 (5th Cir.1985); *United States v. Grayson State Bank*, 656 F.2d 1070, 1075 (5th Cir.1981), *cert. denied*, 455 U.S. 920, 102 S.Ct. 1276, 71 L.Ed.2d 460; *Washington v. Watkins*, 655 F.2d 1346, 1353 (5th Cir.1981), *reh'g denied*, 662 F.2d 1116, *cert. denied*, 456 U.S. 949, 102 S.Ct. 2021, 72 L.Ed.2d 474; See 9A Wright & Miller, FEDERAL PRACTICE & PROCEDURE § 2589 at 608 (2d Ed.1995) (citing authorities); See also Childress & Davis, supra at 11-22 ("Because abuse of discretion review and clearly erroneous review tend to merge when the discretionary judgment calls overlay fact decisions, it is unlikely that the outcome is much altered in most cases.")

## VII. Analysis of Trial Court's Ruling

### A. The trial court's ruling was based on numerous clearly and manifestly erroneous findings of facts.

The trial court clearly erred in several preliminary factual findings concerning the admissibility of Dr. Jenkins' testimony under Rule 104(a), viz., (1) that Dr. Jenkins did not consider the results of the allergy test performed by Dr. Alvarez; (Dr. Jenkins testified that he reviewed the allergy test results in determining his final diagnosis and etiology. Moreover, the test results tended to rule out allergies, thus confirming Dr. Jenkins' opinion that Moore's disease stemmed from his exposure to the chemical mixture.) (2) that Dr. Alvarez expressed "a number of statements and opinions" in his deposition that were distinguishable from those of Dr. Jenkins; (Except for Dr. Jenkins' more impressive qualifications and experience, there was no material difference between the bases of medical knowledge underlying the doctors' opinions because Dr. Alvarez relied almost totally on the work, analysis and opinions of Dr. Jenkins. The trial court clearly erred in its single attempt to point to a specific difference, i.e., in its erroneous statement that Dr. Jenkins had not reviewed or considered the results of Dr. Alvarez's allergy test.) (3) that Moore was exposed to toluene only, rather than to a mixture of chemicals; (The MSDS introduced into evidence at the beginning of the trial clearly listed the mixture of chemicals to which Moore had been exposed. Dr. Jenkins' and Dr. Alvarez testified that, according to the histories taken from Moore and the MSDS, Moore was exposed to a mixture of chemicals, not merely to toluene. Moreover, attorneys for both sides expressly and tacitly agreed to this established fact during the pre-trial in limine hearing.) (4) that at the second proffer hearing Dr. Jenkins said he relied entirely on the MSDS; (Dr. Jenkins, in both his live and deposition testimony, stated that he based his opinion on his examinations, history taking, testing and reviewing other doctors' work on Moore's illness, and only partly on the MSDS. Dr. Jenkins's testimony before the court was clearly supplementary to the proffer of his testimony by way of deposition and affidavit and not in lieu thereof.)

Additionally, the trial court clearly misunderstood the lack of relevance of the fact that Dr. Jenkins' candidly acknowledged that he did not know how the manufacturer assessed the dangers of its product for purposes of affixing the MSDS warnings. Dr. Jenkins did not propose to testify to any knowledge or opinion based on the MSDS warnings, much less to base his opinion as to cause of disease on the warnings. Dr. Jenkins, in arriving at his opinion, used the MSDS only as a source of information as to the types of chemicals that Moore had inhaled. The MSDS was introduced into evidence without objection at the commencement of trial. Moreover, Dr. Alvarez referred to the MSDS for this purpose during his deposition, affidavit and live testimony proffer without any protest by the court or the defendants-appellees. During the trial Dr. Alvarez and Dr. Robert Jones, the defendants-appellees' expert witness on causation, referred to the MSDS for this purpose without objection from the court or the parties. There was no evidence that Dr. Alvarez or Dr. Jones had any knowledge of the research techniques that the manufacturer used in formulating the MSDS warnings. The absence of such knowledge was totally irrelevant to the proposed or actual testimony of any of the expert medical witnesses, including that of Dr. Jenkins.

Hence, the trial court manifestly erred, clearly erred and abused its discretion by relying on these plainly erroneous facts and understandings.

B. Erroneous determinations of mixed questions of law and fact, legal inferences from the facts, and applications of law to the facts; and abuse of discretion in such determinations, inferences and applications.

1. Under Rule 702

The trial court erred in applying Rule 702 to exclude Dr. Jenkins' testimony that Moore's inhalation of the mixture of chemical gases caused his reactive airways disease. Rule 702, as illumined by *Daubert*, requires that an expert's opinion or inference be soundly grounded in the principles and methodology of his or her discipline. The opinion of Dr. Jenkins was well grounded in the principles and methodology of his field of clinical medicine. Because Dr. Jenkins did not use any novel technique, method or principle, but employed only the traditional medical knowledge within his field, we conclude that the opinion of Dr. Jenkins was soundly grounded in the principles, experience and methodology of his discipline.

As we noted above, most of the trial court's reasons for excluding Dr. Jenkins' testimony as to cause of disease under Rule 702 were invalid because they were based on the court's clearly erroneous factual findings and its misunderstanding of the relevance of facts clearly established by the record. The single remaining reason assigned by the trial court for its ruling, i.e., that Dr. Jenkins had no scientifically precise information concerning the "level of exposure, amount of exposure, and duration of exposure," reflects the trial court's error and abuse of discretion in applying Rule 702 to the proffer of Dr. Jenkins' opinion based on clinical medical knowledge. By this statement, of course, the trial court did not mean that Dr. Jenkins had no information whatsoever concerning the levels of exposure that could be harmful to a person susceptible to reactive airways disease or the amount and the duration of Moore's exposure to the mixture of chemicals. From Moore's history that Dr. Jenkins had taken, he had information that before the exposure Moore was in good health, that two 400 pound drums of the chemicals had begun leaking in the back of Moore's truck at some time before his arrival at Ashland, that Moore's rig consisted of a diesel tractor and a 28 foot enclosed trailer, that after the discovery of the leakage upon arrival at Ashland the drums were allowed to continue to leak inside the trailer with the doors shut for another 45 minutes until the Ashland supervisor told Moore to remove them, that at this point the 400 pound drums had become light enough to allow Moore and others to roll them manually out onto the dock, that Moore and a co-employee worked in and around the trailer for about 45 to 60 minutes sprinkling "Absorbo" over the contaminated areas, sweeping the saturated material into shovels, removing the materials from the trailer, and shoving the leaking drums into salvage drums, that Moore finished the cleanup at Ashland about 11:00 a.m., that Moore began to experience shortness of breath, wheezing, and tightness of chest at about 11:45 a.m., that as his symptoms were continuing to worsen Moore consulted the company doctor who put him on oxygen and inhalants.[5] Obviously, the trial court meant that because no one had taken any air samples or timed Moore's encounter with the mixture of chemicals with a stop watch, Dr. Jenkins did not have scientifically precise exposure information in terms of parts per million and exact minutes and seconds; and that because there had been no known experiments on humans or animals with the particular mixture of chemicals involved, Dr. Jenkins could not have had precise scientific information as to the safe or unsafe exposure levels for average or hypersensitive persons with respect to the risk of reactive airways disease. Plaintiffs' exhibit 7, pp. 1-4.

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[5] The dissenting opinion at page 710 is simply mistaken in stating that Dr. Jenkins had "no information" concerning the size of the trailer, the amount of the spillage, the level or duration of exposure. The dissent, like the trial court, fails to heed *Daubert*'s admonition that "[t]he focus . . . must be solely on principles and methodology, not on the conclusions that they generate." *Daubert*, 509 U.S. at 595, 113 S.Ct. at 2797.

The goals, principles and methodology of clinical medicine do not require or permit a clinical physician to determine by hard scientific testing the precise amount of a deleterious substance that an accident victim inhaled or the exact duration during which he breathed it in before the doctor must make the interrelated decisions as to diagnosis, cause and prognosis of a pulmonary or airways disease. Likewise, a clinical physician cannot ethically or practicably delay decisions as to diagnosis-etiology until she conducts experiments with humans or animals to determine the safe level of exposure for average or highly susceptible persons with respect to substances that previously have not been tested or addressed by medical literature. Consequently, as Dr. Jenkins, Dr. Alvarez, and even Dr. Jones, the defendant-appellees' expert, testified, scientifically exact information as to "the level of exposure, amount of exposure, and duration of exposure" is virtually never available to a clinical physician after an inhalation accident or episode. When assessing the basis of Dr. Alvarez's opinion, the trial court correctly ruled that the lack of precise exposure data will go to the weight of his testimony rather than to its admissibility. Yet the trial court inexplicably reversed field and made crucial the importance of precise exposure data in incorrectly and arbitrarily excluding Dr. Jenkins' opinion on cause of disease. Because of the trial court's allusions to lack of "scientific support" and to "scientific speculation" when discussing the proffer of Dr. Jenkins' opinion, we infer that the trial court may have misapplied the "*Daubert* factors," hard scientific methods appropriate for testing proffers of hard scientific evidence, to the proffer of Dr. Jenkins' opinion based on clinical medical knowledge. The trial court's error in this regard, of course, was compounded by its erratic failure to apply the same reasoning to the proffer of Dr. Jenkins' opinion as it had to Dr. Alvarez's testimony. Accordingly, we conclude that the trial court manifestly erred and abused its discretion in deciding that the lack of precise, hard scientific exposure data prevented Dr. Jenkins' opinion from being soundly grounded in the principles and methodology of his discipline and therefore based on a reliable foundation.

*Watkins v. Telsmith, Inc., 121 F.3d 984, 991 (5th Cir.1997)* explicitly makes clear that Rule 702, as elucidated by *Daubert*, authorizes a qualified expert in a realm outside of hard science to testify to an opinion or inference based on his knowledge, skill, experience, training, or education if it is soundly grounded in the principles and methodology of his discipline and is relevant to a fact in issue or to an understanding of the evidence. Even prior to *Watkins*, however, this circuit and others had at least implicitly understood this to be part of *Daubert* lore. *See United States v. 14.38 Acres of Land*, 80 F.3d 1074 (5th Cir.1996)(engineer's opinion of potential for floods; real estate appraiser's opinion of value of land affected); *Hopkins v. Dow Corning Corp.*, 33 F.3d 1116, 1124-25 (9th Cir.1994)(doctors' opinions of silicone breast implants' cause of autoimmune disease); *Berry v. City of Detroit*, 25 F.3d 1342, 1350 (6th Cir.1994)(former sheriff's opinion of inadequate police discipline's cause of unjustifiable use of deadly force) ("Although . . . *Daubert* dealt with scientific experts, its language relative to the 'gatekeeper' function of federal judges is applicable to all expert testimony offered under Rule 702."

*Id.*); *Marcel v. Placid Oil Co.*, 11 F.3d 563, 567 (5th Cir.1994) (economist's opinion of work-life expectancy); Cf. *United States v. Murphy*, 996 F.2d 94, 98-99 (5th Cir.1993), *cert. denied*, 510 U.S. 971, 114 S.Ct. 457, 126 L.Ed.2d 389 (1993) (expert's opinion that tools could have made marks on stolen cars' ignitions admitted).

Furthermore, as one commentator has recognized, simply because a non- scientific expert's testimony touches on evidence that theoretically could be tested by Newtonian science methodology, *Daubert* should not be interpreted so as to permit an advocate to put his or her opponent to the burden of establishing hard scientific reliability-validity upon demand. *See* 2 GRAHAM, HANDBOOK OF FEDERAL EVIDENCE § 702.5, at 79 (4th ed. 1996) ("For example, it would be ludicrous to require the proponent of a doctor's testimony to introduce evidence that every test the doctor conducted or reasonably relied upon under Rule 703 is scientifically reliable-valid. While 'widespread acceptance' is stated to be merely a factor in a judicial determination of reliability-validity, testimony by the expert that the 'scientific' evidence has received 'general acceptance' . . . should be sufficient alone to support admissibility of 'scientific' evidence unless the opponent presents evidence creating a genuine issue as to the reliability-validity of the 'scientific' evidence . . . .")(footnotes omitted). *See also* G. Michael Fenner, *The Daubert Handbook: The Case, Its Essential Dilemma, And Its Progeny*, 29 Creighton L. Rev. 939, 968 (1996)("Fenner"). *Cf.* Edward J. Imwinkelried, *The Next Step After Daubert: Developing A Similarly Epistemological Approach To Ensuring The Reliability Of Nonscientific Expert Testimony*, 15 CARDOZO L. REV. 2271, 2283-94 (1994).

In the field of clinical medicine, courts generally agree that, under *Daubert*, the methodology and data that diagnosing and treating physicians reasonably consider good grounds for opinions or inferences in medical practice are sufficiently reliable to form the basis of a qualified medical expert's testimony in court. *See* 3 WEINSTEIN & BERGER, WEINSTEIN'S EVIDENCE ¶ 703[03], p. 703-24 *et seq.*(Rel.47-7/93 Pub.803); 2 GRAHAM, HANDBOOK OF FEDERAL EVIDENCE § 702.5 at 79 (4th ed.1996); Fenner at 1009.

For example, this court in *Carroll v. Morgan*, 17 F.3d 787, 790-791 (5th Cir.1994), concluded that a cardiologist's testimony was "ground[ed] in the methods and procedures of science" and was not mere "unsupported speculation," citing *Daubert*, 509 U.S. at 590, 113 S.Ct. at 2795 despite his refusal to accept, as authoritative, either a single source or a collection of textbooks and journals *in toto*, because his testimony was based on "thirty years of experience as a practicing, board-certified cardiologist, on his review, among other things, of [the deceased plaintiffs'] medical records and the coroner's records, and on a broad spectrum of published materials."

The Fourth Circuit in *Benedi v. McNeil-P.P.C., Inc.*, 66 F.3d 1378, 1383 (4th Cir.1995), held that the testimony of experts who found a causal link between the plaintiff's liver failure and a combination of alcohol and Extra-Strength Tylenol was reliable although they did not use epidemiological data. Instead, they relied on the plaintiff's history, personal examinations of plaintiff, plaintiff's lab and pathology data, and peer-reviewed literature. In other words, the experts relied on the kind of data the medical community uses regularly in diagnosing patients. The court stated that it would "not declare such methodologies invalid in light of the medical community's daily use of the same methodologies in diagnosing patients." *Id.*

The Second Circuit in *McCullock v. H.B. Fuller Company*, 61 F.3d 1038, 1043 (2d Cir.1995), held that the district court properly admitted the testimony of a medical doctor as to the causal link between glue vapors and plaintiff's injury, rejecting defendant's contentions that the doctor's methodology was flawed because he "could not point to a single piece of medical literature that says glue fumes cause throat polyps" and because " 'differential etiology,' [does not] qualif[y] as scientific under *Daubert*." *Id.* However, the basis of the doctor's opinion included his care and treatment of the plaintiff, her medical history, review of her medical and surgical reports, pathological studies, review of defendant's MSDS, his medical training and experience, use of differential etiology, and reference to scientific and medical treatises. *Id.* The court found that "[d]isputes as to the strength of his credentials, faults in his use of differential etiology as a methodology, or lack of textual authority for his opinion, go to the weight, not the admissibility, of his testimony." *Id.* at 1044. " 'Vigorous cross examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.' " *Id.*,(citing *Daubert*, 509 U.S. at 596, 113 S.Ct. at 2798). *See also Becker v. Nat'l. Health Prods., Inc.*, 896 F.Supp. 100 (N.D.N.Y.1995) (admitting one expert's opinion based, in part, on over 30 years experience as a physician, and a second expert's opinion based, in part, on "clinical experience with 10,000 patients solely in gastroenterology"); *Cantrell v. GAF Corp.*, 999 F.2d 1007, 1014 (6th Cir.1993)("Nothing . . . prohibits an expert witness from testifying to confirmatory data, gained through his own clinical experience, on the origin of a disease or the consequences of exposure to certain conditions").

### 2. Under Rule 403

The trial court clearly abused its discretion in excluding the testimony of Dr. Jenkins under Rule 403. The only reason the trial court gave was that "it would be highly prejudicial and misleading to have the jury accept from Dr. Jenkins's history and credentials that his opinion as to causation is other than scientific speculation, because that's what I heard him testify to." The trial court's reason was not clearly expressed and suggests several meanings.

The fact that an expert witness is highly credentialed cannot create a danger of "unfair" prejudice. "Unfair prejudice," as used in Rule 403 does not exist simply because the evidence is adverse to the opposing party. Virtually all evidence is prejudicial or it is not material. There must be a danger of "unfair" prejudice in order for the discretion to exclude to arise. *Dollar v. Long Mfg., N.C., Inc.*, 561 F.2d 613 (5th Cir.1977); *United States v. McRae*, 593 F.2d 700 (5th Cir.1979).

The trial court's reference to "history" was ambiguous. If the court referred to Dr. Jenkins' own history or experience, this, of course, was part of his credentials or qualification, which could not be unfairly prejudicial for the reason we have stated. If the court was referring to the medical history of Moore taken by Dr. Jenkins, it is equally difficult to see how any unfair prejudice could have been caused. By admitting the testimony of Dr. Jenkins as to his diagnosis of Moore's reactive airways disease, the court also allowed Dr. Jenkins to refer to the history taken as part of the clinical diagnostic process. In fact, Dr. Jenkins specifically stated at trial, without objection before the jury, that he had relied on the history he took of Moore in making his diagnosis as to Moore's condition. Furthermore, by admitting the testimony of Dr. Alvarez as to both diagnosis and cause of disease, the court allowed Dr. Alvarez to refer to the history and other work by Dr. Jenkins used by him as the basis for his own opinion.

The trial court's characterization of Dr. Jenkins' opinion as to causation as "scientific speculation" was essentially a repetition of its reason for excluding that evidence under Rule 702, i.e., for lack of a reliable evidentiary basis. The trial court's exclusion of the evidence as unreliable under Rule 702 was itself manifestly erroneous and an abuse of discretion. Therefore, it cannot serve as a ground for excluding the evidence under Rule 403.

## VIII. Harmful Error Affecting Substantial Rights

Federal Rule of Evidence 103(a) provides: "Effect of erroneous ruling. Error may not be predicated upon a ruling which admits or excludes evidence unless a substantial right of the party is affected. . . ." This Rule indicates that courts of appeals should not reverse on the basis of erroneous evidentiary rulings unless a party's "substantial right" is affected. *Munn v. Algee*, 924 F.2d 568, 573 (5th Cir.1991).

Having determined that Dr. Jenkins' testimony as to the cause of Moore's injury was improperly excluded, we must address whether the exclusion affected Moore's "substantial rights". *EEOC v. Manville Sales Corp.*, 27 F.3d 1089, 1094 (5th Cir.1994). This question is not susceptible to mechanical analysis. *Munn v. Algee*, 924 F.2d at 573(quoting 1 J. Weinstein & M. Berger, *Weinstein's Evidence* ¶ 103[01] at 103-6 (1990)) ("Rule 103 is silent as to what factors a court must consider in determining whether substantial rights have been affected, indicating that the court must proceed on a case to case basis rather than apply a mechanical rule.") We have stated repeatedly, however, that an error is harmless if the court is sure, after reviewing the entire record, that the error did not influence the jury or had but a very slight effect on its verdict. *E.E.O.C. v. Manville Sales Corp.*, 27 F.3d 1089, 1095 (5th Cir.1994); *Munn v. Algee*, 924 F.2d at 573; *Pregeant v. Pan Am. World Airways, Inc.*, 762 F.2d 1245, 1249 (5th Cir.1985); *United States v. Underwood*, 588 F.2d 1073, 1076 (5th Cir.1979).

After reviewing the record, we cannot be sure that the erroneous exclusion of Dr. Jenkins' causation testimony did not influence the jury. In fact, we are convinced that it had more than a very slight effect on the jury's verdict. It is highly likely that the jury's verdict was based on a finding that Moore's exposure to the chemical gases did not cause his disease. The exclusion of Dr. Jenkins' testimony on cause of disease eliminated the plaintiffs' most probative evidence that Moore had contracted reactive airways disease as the result of his exposure to the mixture of chemical gases at Ashland. Further, it undermined the effectiveness of Dr. Alvarez, the plaintiffs' lesser qualified and only remaining witness on causation, who relied on Dr. Jenkins' work and analysis but was unable to explain the data and the inference of causation as accurately and persuasively. Also, the exclusion of Dr. Jenkins' testimony on causation created a mismatch between Dr. Alvarez and Dr. Jones, the defendant's more qualified, articulate, and forensically experienced "board certified" expert causation witness; Dr. Jones did not examine Moore but interpreted the medical records and data compiled by Dr. Jenkins to indicate that Moore did not have RADS or any disease caused by his inhalation of the gases at Ashland. Moreover, because Dr.

Jenkins was called by the plaintiffs to testify as to his evaluation and diagnosis of Moore's condition but was not asked what caused it, there is a substantial possibility that the jury concluded that Dr. Jenkins' opinion would have been unfavorable to the plaintiffs on that subject.

Dr. Alvarez was forced to admit on cross examination that he relied heavily on the work of Dr. Jenkins, his former teacher, especially for the medical history, earlier examinations and testing of Moore. Dr. Alvarez was unable to explain, as Dr. Jenkins had in his excluded testimony, that early mistaken notes in the medical history as to the type of toluene involved were later corrected and did not affect the doctors' causation analysis. After the plaintiffs' rested their case, the defendants presented only the testimony of Dr. Jones who effectively contradicted Dr. Alvarez's testimony on causation. The defendants' attorney took full advantage of the erroneous exclusion of Dr. Jenkins' causation testimony, pointed out that only Dr. Alvarez had testified that Moore's RADS resulted from his chemical inhalation, that Dr. Alvarez was not "board certified" like Dr. Jones and Dr. Jenkins, and argued that Dr. Alvarez had accepted Dr. Jenkins' medical history and diagnosis without independently evaluating Moore's condition. In its verdict, the jury answered "No" to the question asking whether the negligence, if any, of the defendants had proximately caused Moore's injury.

The defendants-appellees and the dissenting opinion argue that the exclusion of Dr. Jenkins' causation testimony was harmless because it was cumulative to that of Dr. Alvarez. The argument is without merit. The testimony about disease and causation by a doctor who has done the original history taking, examinations, testing, diagnosis and etiology of a patient cannot be cumulative to that of a subsequent treating physician who essentially adopts and relies on the original doctor's work, analysis and opinions. To so contend would be as untenable as arguing that testimony by the author of a medical treatise is merely cumulative to that of anyone qualified to read and explain the text. Dr. Jenkins was the only expert witness who had made a thorough, comprehensive clinical medical evaluation of Moore; his work was the essential foundation for the opinion and testimony of the other expert witnesses. *See Johnson v. United States*, 780 F.2d 902, 906 (11th Cir.1986) (wrongly excluded expert's testimony was more comprehensive than that of other experts admitted "and was, therefore, at least partially non-cumulative."); See also 22 Wright & Graham, FEDERAL PRACTICE & PROCEDURE § 5220 at 306 (1978)("[T]he question to be asked is whether the evidence on one side is so full that no jury that rejected it would be likely to change its mind because of the introduction of the proffered evidence."). Dr. Jenkins' qualifications were more impressive and his experience was broader and more extensive than that of Dr. Alvarez. *Id.* Moreover, Dr. Jenkins' explanation of the knowledge, principles, methodology, and reasoning underlying his causation opinion was significantly more lucid and articulate than that of Dr. Alvarez.

The cases relied on by the dissenting opinion are distinguishable as instances in which the excluded expert testimony was truly cumulative because it was interchangeable with and not foundational or seminal to that of the experts whose testimony was admitted. *See Kendra Oil & Gas, Inc. v. Homco, Ltd.*, 879 F.2d 240, 243 (7th Cir.1989)(court stated that a "gaggle" of experts had been allowed to testify to the exact same issue such that the exclusion of one of the defendants' three experts was harmless error); *Collins v. Wayne Corp.*, 621

F.2d 777, 782-83 (5th Cir.1980)(the plaintiffs had already been allowed to place into evidence, through two other witnesses, the points they sought to prove by putting the defendant's expert's deposition testimony into evidence so that the exclusion of the expert's deposition was harmless error); *Miley v. Delta Marine Drilling Co.*, 473 F.2d 856, 858 (5th Cir.1973)(appellant was allowed two experts at trial to testify to the same issue such that the exclusion of a third was harmless error). In the present case Dr. Alvarez's testimony was heavily dependent upon and not fungible with that of Dr. Jenkins. Moreover, the erroneous exclusion of Dr. Jenkins' testimony caused additional prejudicial effects to plaintiffs' case, such as undermining and confusing Dr. Alvarez's testimony, mismatching Dr. Alvarez against Dr. Jones, and possibly creating the false impression that Dr. Jenkins, the more qualified and experienced of plaintiffs' experts, did not support Dr. Alvarez's causation testimony.

Because we cannot say with conviction that the erroneous exclusion of the testimony of Dr. Jenkins on the issue of cause of disease did not influence the jury or had but a slight effect upon its verdict, we conclude that the plaintiffs' substantial rights were affected and that the error was not harmless.

## IX. Refutation Of Inapposite Arguments

The argument by the the defendants-appellees and the dissenting opinion that the proffer of Dr. Jenkins's testimony as to clinical medical knowledge should be assessed for reliability according to whether it is grounded in hard scientific dosage or exposure level methodology begs the question. First, it assumes without demonstration that this case involves a proffer of hard scientific, not clinical medical, evidence. Next, from that unproven assumption, it infers that the proffer must be tested for reliability as hard scientific evidence by the hard scientific methods set forth in *Daubert*, also known as the "*Daubert* factors". Finally, it concludes that the proffered evidence is unreliable because it was not attained by use of the hard scientific methodology.

The argument relies on a misapplication of the *Daubert* factors. In *Daubert*, the Supreme Court clearly indicated that the proffer of an expert's testimony must be tested for evidentiary reliability by determining whether the expert's opinion is soundly grounded in the principles and methodology of the *proffered expert's* discipline. The court derived the hard scientific methods, now called "*Daubert* factors," from the methodology of the discipline of hard science. The court advised trial judges to use these hard scientific methods or factors in determining whether proffers of testimony as to hard *scientific knowledge* are well grounded in hard *scientific methodology*. The *Daubert* court plainly did not intend to require trial judges to use hard scientific methods to test the reliability of proffers outside the sphere of hard science. The hard scientific methods generally are inappropriate for determining whether an expert's opinion is soundly grounded in the principles and methodology of the discipline of clinical medicine. Only a brief comparison of the disciplines of hard science and clinical medicine is needed to see that they have quite different and disharmonious goals, principles and methodology. *See infra.*, pp. 688-90.

The proffer at issue in the present case is that of an expert's testimony based on clinical medical knowledge. Consequently, under Rule 702, as explained by *Daubert*, the proffer must be tested for evidentiary reliability by determining whether the expert's opinion is soundly grounded in the principles and methodology of the discipline of clinical medicine. When the proffer of Dr. Jenkins' testimony based on clinical medical knowledge is properly analyzed, as we have shown above, it is evident that his opinion was soundly grounded in his discipline of clinical medicine, was evidentiarily reliable and should have been admitted.

The trial court erroneously failed to assess Dr. Jenkins cause of disease opinion by reference to the principles and methodology of his discipline of clinical medicine. The trial court assumed that Dr. Jenkins' opinion, in order to be evidentiarily reliable under Rule 702 and *Daubert*, must have been attained by hard scientific methods, such as air samples comparing the ratio of contaminated parts per million with safe dosage or exposure level standards derived from epidemiological studies or experimentation with animals. Dr. Jenkins' opinion, that Moore's exposure to the mixture of chemicals caused his disease, was derived by clinical medical methods and not by use of hard scientific methods. Therefore, the trial court mistakenly concluded that Dr. Jenkins' opinion was not reliable because it was not attained by the use of hard scientific methods.

Inexplicably, the trial court did not test the reliability of Dr. Alvarez's cause of disease opinion, which used the identical basis to reach the identical conclusion, by whether or not he used such hard scientific methods. Instead, the court said that Dr. Alvarez's use of clinical medical methodology instead of hard scientific methods, and his lack of precise information as to exposure levels and standards, would merely go to the weight of his testimony. The trial court acted arbitrarily and abused its discretion by not judging Dr. Jenkins' proffered testimony by clinical medical principles and methodology as it did Dr. Alvarez's testimony.

The argument of the dissenting opinion and the defendants-appellees' brief follows the same erroneous path as the trial court's reasoning. Consequently, in support of their arguments they point only to inapposite cases involving primarily the proffers of experts' testimony based on professed hard scientific knowledge relative to the surreptitious causation of insidious diseases; and they disregard entirely the many pertinent decisions approving the introduction of experts' opinions as to the causation of episodic traumatic injuries and disorders based on well established clinical medical methodology such as the clinical physician's examination, testing, differential diagnosis, and history taking of the patient or victim.

The dissenting opinion relies primarily on *Allen v. Penn. Engineering Corp.*, 102 F.3d 194 (5th Cir.1996), but that case is not persuasive here because it is markedly distinguishable from the present case. *Allen* was a products liability suit against the manufacturer of ethylene oxide sterilizers by the widow and child of a hospital maintenance worker who died of brain cancer after 20 years on the job in which he occasionally replaced cylinders containing the sterilizers. The plaintiffs proffered expert scientific testimony that there is a causal link between human brain cancer and ethylene oxide exposure. The plaintiffs' experts based their opinions on evidence developed with hard scientific methods, viz., epidemiological studies, animal studies, cell biology, and health organization conclusions. The defendants responded with numerous reputable epidemiological studies indicating there is not a correlation between the ethylene oxide exposure and cancer of the human brain. The trial court found the plaintiffs' experts to be unqualified and also excluded their testimony for lack of sufficient scientific grounding. This court of appeals affirmed, holding that under Rule 702 the scientific data relied on by the experts did not furnish a scientifically valid basis for their conclusions, due to the paucity of epidemiological evidence, the unreliability of animal studies, and the inconclusiveness of cell biology. *Id.* at 198. In expressing an opinion on an issue not reached by the trial court, this court stated that the evidence was also excludable under Rule 703 because "[i]n this case, there is no direct evidence of the level of Allen's exposure to EtO. The [experts'] opinion relies principally on the affidavit of a coworker and on extrapolations concerning EtO handling at the hospital where Allen worked based on conditions in other hospitals in the 1970's." *Id.* at 198.

Because of its dissimilarities the *Allen* case does not control or even help to understand or to decide the present case. *Allen* was purely a scientific evidence case, in which the proffer of hard scientific expert testimony was not soundly grounded in scientific principles or methodology, and in which there was no evidence that the deceased was ever actually exposed to the substance that his widow and child alleged had caused his brain cancer. Also, the experts never examined the deceased before or after his death, there was no evidence of his medical history, there was no indication that he had any relevant symptoms or signs during his life, and apparently no tests were ever performed on his body or brain. Thus, the case involved a proffer of hard scientific testimony, not clinical medical testimony, and it had not been shown that the proffered scientific evidence was reliably grounded in scientific principles and methodology.

The present case is purely a clinical medical evidence case. A live plaintiff gave histories to doctors and testified without contradiction that he was in good health until he was exposed to a mixture of chemical gases in and around an enclosed 28 foot trailer for approximately one hour; and that within an hour thereafter he developed severe coughing, wheezing and tightness of the chest. Unlike the *Allen* case in which there was no evidence of exposure to the dangerous substance, the fact that Moore inhaled a mixture of toxic gases escaping from leaking drums for approximately one hour was not disputed in the instant case. The doctors who examined, tested and took histories from him found that he had signs and symptoms consistent with reactive airways disease. The doctors arrived at opinions that the plaintiff suffered from reactive airways disease caused by his exposure to the mixture of chemicals. Their opinions were soundly grounded in their discipline of clinical medicine. The defendants did not respond with scientific evidence but with the testimony of a third clinical physician who, without ever examining the plaintiff or developing any new data, reinterpreted the facts and data developed by the first two doctors to arrive at a contrary opinion.

The dissenting opinion strays farther afield in its reliance on *Wright v. Willamette Industries, Inc.*, 91 F.3d 1105 (8th Cir.1996). The Eighth Circuit's decision was based largely on Arkansas negligence and proximate cause law. The divided panel held that a family who lived near the defendant's plant at which wood particles were treated with formaldehyde could not recover for their claims of minor afflictions, such as headaches, sore throats, watery eyes, running noses, dizziness, and shortness of breath, because they failed to produce evidence that they were exposed to a hazardous level of formaldehyde from the fibers emanating from the plant. The part of the first passage of *Wright* which the dissenting opinion quotes does not pertain to the admissibility of evidence but to minimum standards of proof and proximate cause. *Id.* at 1107. Also, the dissenting opinion omits the remainder of that passage, which reads: "We do not require a mathematically precise table equating levels of exposure with levels of harm, but there must be evidence from which a reasonable person could conclude that a defendant's emission has probably caused a particular plaintiff the kind of harm of which he or she complains before there can be a recovery." *Id.* The Eighth Circuit stated, however, that the trial court should have "excluded Dr. Peretti's testimony, as Willamette requested it to do, because it was not based on scientific knowledge." *Id.* at 1108 (*citing Daubert* and Rule 702). This certainly indicates that Dr. Peretti purported to present hard scientific testimony. The opinion does not state what kind of doctor Peretti was or upon what he said his opinion was based. Two other doctors mentioned by *Wright* were Dr. Fred Fowler, an industrial hygienist, and Dr. Jimmie Valentine, a pharmacologist. There is no indication that Peretti was a clinical physician or that he based his opinion on the methodology of clinical medicine.

The Seventh Circuit decision relied upon by the dissenting opinion, *Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316 (7th Cir.1996), is also a scientific evidence case that is clearly distinguishable from the present case involving the proffer of a clinical medical opinion. A 60 year old smoker with a history of coronary artery disease, previous heart attack, high blood pressure, cholesterol count, and continued smoking, who suffered another heart attack after using a nicotine patch for three days, brought a products liability action against the manufacturer of the patch. The court of appeal affirmed a summary judgment based on the trial court's conclusion that the plaintiff's scientific expert's "opinion concerning the role of the nicotine patch in Rosen's heart attack," was inadmissible. *Id.* at 318. The Seventh Circuit affirmed because the "scientific evidence" supplied "nothing but a bottom line" offering "neither a theoretical reason to believe that wearing a nicotine patch for three days, or removing it after three days, could precipitate a heart attack, or any experimental, statistical, or other scientific data from which such a causal relation might be inferred or which might be cause to test a hypothesis founded on theory." *Id.* at 318-319. The scientific expert was Dr. Fozzard, "a distinguished cardiologist and department head at the University of Chicago." *Id.* at 318. His testimony was proffered, however, as hard "scientific evidence," not as clinical medical evidence. *Id.* at 318. The court of appeal opinion is devoid of any indication that the scientific expert had ever seen, examined, tested or taken a history from the plaintiff. Consequently, the *Rosen* decision deals solely with the proffer of hard scientific testimony insufficiently grounded in scientific methodology and not the proffer of clinical medical testimony soundly grounded in the principles and methodology of that discipline, as in the present case.

Finally, the defendants-appellees contend that Texas state practice on jury instructions is controlling in this case and that the plaintiffs waived their argument that Dr. Jenkins' testimony was not cumulative. We have considered the arguments and find them to be clearly without merit. In view of our disposition of this case, we do not reach the parties' cross-appeals relative to costs of court assessed by the trial court.

## X. CONCLUSION

For the reasons assigned, the judgment of the district court is REVERSED and the case is REMANDED to that court for further proceedings in accordance with this opinion.

W. EUGENE DAVIS, Circuit Judge, dissenting:

## I.

I thoroughly disagree with the majority's conclusion that the district court erred in excluding Dr. Jenkins' opinion that Mr. Moore's reactive airway disease ("RAD") was triggered by his exposure to a Toluene solution at Ashland's facility.

The question we must decide is whether the district court was overzealous in performing the "gatekeeper" role the Supreme Court assigned to it in *Daubert*[1] to admit only expert opinions that are "reliable." *Daubert* explains that expert testimony must be "scientific," that is based on scientific "knowledge" that is "grounded in the methods and procedures of science,"[2] and that assists the trier of fact by having a "valid scientific connection to the pertinent inquiry." Id. at 590-92, 113 S.Ct. at 2795-2796; *see also* G. Michael Fenner, *The Daubert Handbook: The Case, its Essential Dilemma, and its Progeny*, 29 Creighton L.R. 939 (1996). At bottom, the district court was charged with making an assessment of whether the reasoning and methodology used by Dr. Jenkins was scientifically valid and whether that reasoning properly applied to the facts at hand.

As in other evidentiary questions, the proponent of the expert testimony must satisfy the trial judge by a preponderance of the evidence that the *Daubert* conditions have been met. *Claar v. Burlington Northern R. Co.*, 29 F.3d 499 (9th Cir.1994). We review preliminary factual findings of the district court necessary for determining admissibility for clear error. *See Bourjaily v. United States*, 483 U.S. 171, 175, 107 S.Ct. 2775,

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[1] 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

[2] 509 U.S. at 589-90, 113 S.Ct. at 2794-2795.

2778, 97 L.Ed.2d 144 (1987). We reverse a district court's evidentiary ruling only for manifest abuse of discretion. *Allen v. Pennsylvania Eng'g. Corp.*, 102 F.3d 194 (5th Cir.1996).

The expert opinion at issue here is, of course, the testimony of Dr. Jenkins on the causal connection between Mr. Moore's exposure to chemicals and his asthmatic-type condition, RAD. Dr. Jenkins is a well-qualified physician specializing in internal medicine and pulmonary disease. Mr. Moore was referred to Dr. Jenkins by his attorney for examination and evaluation. Dr. Jenkins saw Mr. Moore on three occasions, took a history from him, examined him, and gave him a number of tests.

The court did permit Dr. Jenkins to testify concerning his contact with Mr. Moore and to give a diagnosis and prognosis for Mr. Moore's recovery. However, the district court declined to permit Dr. Jenkins to testify concerning the cause of Mr. Moore's condition. Before declining to allow Dr. Jenkins to give an opinion on the causal connection between the chemical exposure and Mr. Moore's condition, the district court allowed Mr. Moore to proffer Dr. Jenkins' live testimony. The district court also considered Dr. Jenkins' deposition, which had been submitted earlier in support of an *in limine* motion to exclude his testimony.

My review of the record leads me to conclude that the district court was fully justified in excluding the testimony. The district court's reasons for excluding part of Dr. Jenkins' testimony were adequately spelled out in the record. R. at 10.154-56. The district court found that Dr. Jenkins had no information concerning the level or duration of Mr. Moore's exposure to the chemicals. This finding is fully supported by the record. Dr. Jenkins himself admitted that he did not know the size of the trailer where the spill occurred or the extent of the spill. The district court was entitled to conclude from this that Dr. Jenkins' estimate that the air in the trailer contained over 200 parts per million of the spilled chemicals was nothing more than speculation. Furthermore, at his deposition and at the pretrial motion in limine, Dr. Jenkins could not point to one piece of scientific literature or research linking exposure to the spilled chemicals and RAD. The majority's conclusion rests on a number of premises that will not withstand scrutiny, each of which I consider below.

## II.

### A.

The majority begins with the remarkable premise that clinical medicine is not "hard" science; *ergo*, a physician's opinion that an illness was caused by a patient's exposure to a toxic substance is not a "scientific" expert opinion. This leads the majority to conclude that *Daubert*'s teaching is inapplicable to the issue presented to the trial court: Whether to admit Dr. Jenkins' testimony. We need go no further than *Daubert* itself to demonstrate the fallacy of this conclusion. In *Daubert*, the Supreme Court considered whether the district court erred in rejecting testimony proffered by the plaintiff to establish a causal connection between the plaintiff's exposure to the drug Bendictin and birth defects. The subject matter of these witnesses' testimony, medical causation, was obviously considered "scientific" by the Court: It was the factual predicate to the Court's guidelines for evaluating whether to admit expert testimony. Although the tendered witnesses in *Daubert* were not physicians, the focus of the decision is on the subject matter of the testimony. The Court does not suggest that its guidelines would not apply if the bearer of the opinion on medical causation had been a physician rather than a biologist or chemist.

If reinforcement is needed for the proposition that medical causation testimony of physicians is indeed "scientific" testimony, it can be found in our post-*Daubert* decisions and all of the decisions addressing the issue from sister circuits.

In *Allen v. Pennsylvania Eng'g. Corp.*, 102 F.3d 194 (5th Cir.1996), this Court held that expert testimony regarding exposure to chemicals and medical causation of cancer was not scientifically valid. The proffered experts' testimony consisted of human epidemiological evidence suggesting a link between ethylene oxide (EtO) exposure and increased risk of brain cancer, scientific studies conducted on rats, and the fact that EtO is known as a mutagen and genotoxin. *Id.* at 196. There were absolutely no scientific studies on a link between human brain cancer and EtO exposure. *Id.* at 197. In excluding the proffered expert testimony, the court stated emphatically that

> the goal of Daubert and this court's previous cases has been to bring more rigorous scientific study into the expression of legal opinions offered in court by scientific *and medical* professionals. In the absence of scientifically valid reasoning, methodology and evidence supporting these experts' opinions, the district court properly excluded them.

*Id.* at 198 (emphasis added).

In *Wheat v. Pfizer, Inc.*, 31 F.3d 340 (5th Cir.1994), the plaintiff sought to offer the testimony of a doctor to support his claim that the drug Feldene caused the plaintiff's hepatitis. While the admissibility of the expert's testimony was rendered moot by the court's resolution of the case on other grounds, the court noted "in passing that [the doctor's] testimony would not have survived the test of Daubert v. Merrell Dow Pharmaceuticals, Inc." *Id.* at 343 (citation omitted). The court continued:

> At the hearing held to evaluate his proffered testimony, Dr. George hypothesized that the combination of Feldene and Chlorzoxazone may have caused [the plaintiff's] hepatitis. He admitted, however, that no study of the combined effects of the drugs had ever been done, and thus his hypothesis lacked an empirical foundation. Neither had it been subjected to peer review and publication, which Daubert also identifies as key.

*Id.* at 343 (citation omitted).

Finally, in *Carroll v. Morgan*, 17 F.3d 787 (5th Cir.1994), a case cited by the majority, we considered whether the district court abused its discretion in allowing a cardiologist to give his opinion on the cause of the plaintiff's death. The court recognized that Daubert controlled the analysis. *Id.* at 789-90.

Our sister circuits are in agreement that medical causation testimony by physicians is indeed "scientific" expert testimony. *Holbrook v. Lykes Bros. S.S. Co., Inc.*, 80 F.3d 777 (3d Cir.1996) (testimony of plaintiff's treating physician on diagnosis and causes of plaintiff's cancer subject to *Daubert* as scientific evidence); *Cavallo v. Star Enter.*, 100 F.3d 1150 (4th Cir.1996) (doctors' opinions on cause of plaintiffs' diseases properly excluded under *Daubert* as not being scientifically reliable); *Glaser v. Thompson Med. Co., Inc.*, 32 F.3d 969 (6th Cir.1994) (physician's testimony as to cause of plaintiff's injuries properly admitted because of valid scientific basis under *Daubert*); *Hose v. Chicago Northwestern Transp. Co.*, 70 F.3d 968 (8th Cir.1995) (physician's expert opinion on plaintiff's exposure to toxic fumes and dust as causing disease subject to *Daubert* factors); *Joiner v. General Elec. Co.*, 78 F.3d 524 (11th Cir.1996), *cert. granted*, __ U.S. __, 117 S.Ct. 1243, 137 L.Ed.2d 325 (1997) (plaintiff's experts' opinions on cause of lung cancer deemed "scientific knowledge"); *Raynor v. Merrell Pharm. Inc.*, 104 F.3d 1371 (D.C.Cir.1997) (doctor's testimony regarding cause of birth defects governed by *Daubert* factors); *Cella v. United States*, 998 F.2d 418 (7th Cir.1993) (case decided before *Daubert* but recognizing that expert medical opinion is "scientific" and should have "an epidemiological or scientific foundation").

In sum, all our post-*Daubert* cases, along with those of our sister circuits, consistently recognize that the admission of a physician's testimony on medical causation is governed by *Daubert*'s requirements, thus announcing in a voice that is loud and clear that such testimony is indeed "scientific" expert testimony. The majority has not cited a single federal appellate case to support its contention that a physician's testimony on medical causation is not considered "scientific" expert testimony.

If somehow one accepts the majority's view that Dr. Jenkins' testimony was not "hard" "scientific" expert testimony, it is nonetheless controlled by *Daubert*. In *Watkins v. Telsmith*, 121 F.3d 984 (5th Cir.1997), this Court concluded that the *Daubert* analysis applied to proffered expert testimony of an engineer, based on his training and experience, regarding the design of a conveyor. We expressly rejected the holding of the majority in today's case and the position of the Tenth Circuit that "application of the *Daubert* factors is unwarranted in cases where expert testimony is based solely on experience or training." *Id.* at 989 (*quoting Compton v. Subaru*, 82 F.3d 1513 (10th Cir.1996)).

## B.

The majority next concludes that we owe no deference to the district court's evidentiary ruling. This determination is based on the conclusion that the district court clearly erred or was confused in its determination of precisely what chemicals were spilled from the drum and inhaled by Mr. Moore. The record does not justify this conclusion.

The Material Safety Data Sheet ("MSDS") was introduced by the plaintiff and was the central item of documentary evidence in the case. This document listed each chemical, including Toluene, that made up the contents of the drum. The MSDS gave special warning about exposure to Toluene, and early in the litigation Mr. Moore focused on Toluene. This is clear from the pleadings of both parties as well as the pretrial depositions of Drs. Jenkins and Alvarez, both of whom had been furnished with copies of the MSDS. Because the MSDS warned specifically about exposure to Toluene and the physicians focused on Toluene, counsel then concentrated on Toluene, the chemical the physicians thought was important. Following the deposition and just before trial, the physicians submitted affidavits designed to expand their testimony to say that they relied on the entire mix of chemicals in the drum rather than Toluene alone as the causative agent.

The majority's numerous references to the trial court as confused as to whether Moore had been exposed to a single chemical or to a mixture of chemicals; lacking a full understanding of both Dr. Jenkins' testimony and the chemical contents of the leaking drum; and "labor[ing] under confusion" are not supported by a fair review of the record. Excerpts from the record, reproduced in the footnote below, demonstrate that the trial judge was fully aware of the chemicals to which Mr. Moore was exposed at Ashland's facility.[3] The record simply

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[3] During the final pretrial conference, held three days before trial, the following exchange occurred:

> THE COURT: Isn't that the only chemical at issue though?
>
> MR. BLACK: No. No, Your Honor.
>
> THE COURT: What chemical —
>
> (Talking off the record)
>
> MR. BANOWSKY: The product was naphtha, that I could recall — naphtha, some propylene glycol methyl ethers, toluene, and naphtha.
>
> THE COURT: But your loss is premised on — is it toluene, what is it?
>
> MR. BLACK: Toluene.
>
> THE COURT: Toluene. The loss is premised on toluene, isn't it?
>
> MR. DAVIS: Your Honor, it's generically referred to as toluene throughout this litigation; however, what this

(Cont'd)

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(Cont'd)

chemical is and what everybody knows in this case from the MSDS is that it is Dow Corning I25-35 release coated which is a component mixture of various chemicals. It is a chemical —

THE COURT: Okay. Let me stop you.

MR. DAVIS: — release coating used.

THE COURT: You're saying that whatever chemical is listed in the Dow Chemical MSDS as toluene is what's at issue here.

MR. DAVIS: No. All the chemicals are at issue here because it's the entire — this release coating is what spilled in the truck. The release coating is made up of toluene, naphtha, petroleum dystolate [sic] and propylene glycol methylene.

THE COURT: All right. That's what I'm trying to determine. There is evidence in the record that these other chemicals were involved in the release? That's all I want to know.

MR. DAVIS: Yes.

THE COURT: Okay. All right. Go on, Mr. Black.

R. at 6.23-24.

The following two excerpts are of testimony given at a hearing outside of the jury's presence on the motion in limine to exclude Dr. Jenkins' testimony:

(Cont'd)

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(Cont'd)

> BY MR. GREEN:
>
> Q All right. After you looked at the MSDS sheet that was based upon testing, took the history, you performed the test, you did the examination. Did you come to a conclusion as to the cause of Mr. Moore's reactive airways disease?
>
> A [by Dr. Jenkins] Yes.
>
> Q And what was that conclusion?
>
> A Well, I feel it was the chemical substances to which he was exposed. There are several of them.
>
> Q All right. And what was that?
>
> A Well, toluene, naphtha, propylene glycol methyl ether I think were the principal ones that had irritating properties.

R. at 10.132.

> THE COURT: . . . Mr. Carpenter, while Dr. Jenkins is looking at that, Mr. Green, would you listen to this and tell me if this is the correct rendition of the chemicals you asked Dr. Jenkins about? Naphtha — And what else?
>
> MR. GREEN: Naphtha, toluene, ethyl methyl glycol ether, I believe.

R. at 10.135-36.

We can tell from the trial judge's reasons for excluding Dr. Jenkins' testimony that she had not forgotten the MSDS or "the substance" it described:

(Cont'd)

does not justify the majority's refusal to give the deference due the trial court in excluding the evidence.

## C.

As an independent basis for excluding the evidence, the district court was entitled to conclude that the expert's opinion was not relevant to the facts at hand. The record does not establish either the level of the chemicals that Mr. Moore breathed or the level required to cause RAD.

In *Allen*, 102 F.3d at 194, the plaintiff offered opinion testimony that his brain cancer had been triggered by his employment-related contact with cylinders containing ethylene oxide. There was a paucity of evidence relating to the extent and level of Allen's exposure to the alleged harmful chemical. As one ground for affirming the district court's rejection of this causation testimony, the court stated: "Scientific knowledge of the harmful level of exposure to a chemical, plus knowledge that plaintiff was exposed to such quantities, are minimal facts necessary to sustain the plaintiff's burden in a toxic tort case." *Id.* at 199.

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(Cont'd)

> Last but not least, I don't know why, if his entire causation testimony is based upon the MSDS, that his testimony would be necessary since the MSDS is in evidence and the MSDS recites that under certain circumstances this substance may be irritant to throat and nose, and vapors may injure, quote, "blood, liver, lungs, kidney, and nervous system depending upon the degree and the effects of concentration and length of exposure."

R. at 10.155.

The *Allen* court cited with approval *Wright v. Willamette Industries*, 91 F.3d 1105 (8th Cir.1996). In that case, the plaintiffs lived a short distance from the defendant's fibreboard manufacturing plant. Plaintiffs sought damages for injuries they argued were caused by breathing airborne formaldehyde and other harmful chemicals emitted from the plant. The court reversed the district court's ruling allowing expert opinion testimony that the plaintiffs' complaints were related to their exposure to the plant's emissions. The court explained that in a suit to recover damages in a tort action:

> It is therefore not enough for a plaintiff to show that a certain chemical agent sometimes causes the kind of harm that he or she is complaining of. At a minimum, we think that there must be evidence from which the factfinder can conclude that the plaintiff was exposed to levels of that agent that are known to cause the kind of harm that the plaintiff claims to have suffered. *See Abuan v. General Elec. Co.*, 3 F.3d at 333.

*Id.* at 1107.

### D.

Even if the district court had found that Dr. Jenkins had sufficient evidence of the level of chemicals to which Mr. Moore was exposed, the district court was entitled to conclude that Dr. Jenkins had no scientific, technical, or other specialized knowledge that would assist the trier of fact in resolving the causation question. Dr. Jenkins' conclusion that the Toluene solution triggered Mr. Moore's RAD was based on two assumptions: 1) *any* chemical with irritating properties can cause RAD (R. at 10.132); 2) the manufacturer's general warning contained in the MSDS that exposure to the chemical could cause damage to a number of organs, including the lungs, established that Toluene was an irritant. The temporal connection between Mr. Moore's exposure to Toluene and his onset of symptoms clinched Dr. Jenkins' conclusion.

Dr. Jenkins could cite no scientific support for his conclusion that exposure to *any* irritant at unknown levels can trigger this asthmatic-type condition. Surely a court is entitled to view such an unsupported, unscientific generality with skepticism. The purpose of *Daubert* was to exclude such speculation, based primarily on a temporal connection, as lacking any scientific validity.

Dr. Jenkins admitted that he knew nothing about who prepared the MSDS, what tests were conducted to support them, or the warning label on the drum of Toluene. No scientific foundation was laid to support the notion that this general warning could serve as the basis for concluding that exposure to unknown quantities of Toluene would likely cause RAD.[4] Dr. Jenkins had no personal experience with Toluene. He admitted that Mr. Moore was the first patient he had examined who claimed that he suffered injury from exposure to this chemical.

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[4] The only literature Dr. Jenkins arguably relied on was an article by Brooks on several case studies. One of these studies related to a 19-year-old store clerk's exposure to floor sealant containing, among other things, Toluene. In addition to the scientific limitations of a single case study, the circumstances surrounding that study were markedly different from Mr. Moore's exposure to the chemical. The floor sealant to which the store clerk was exposed contained a number of irritants in addition to Toluene. Some of the other ingredients may have been more irritating than Toluene. Also, the clerk was exposed to Toluene while working in a small space for two and one-half hours. While he was still on the job, the clerk experienced a number of symptoms, such as dizziness and headaches.

The scientific proof on causation in this case suffers the same infirmities as the causation evidence in *Wright*, in which the court stated:

> It is true that Dr. Frank Peretti, after a great deal of prodding, testified that the Wrights' complaints were more probably than not related to exposure to formaldehyde, but that opinion was not based on any knowledge about what amounts of wood fibers impregnated with formaldehyde involve an appreciable risk of harm to human beings who breathe them. The trial court should therefore have excluded Dr. Peretti's testimony as Williamette requested it to do, because it was not based on scientific knowledge. [citing cases] Dr. Peretti's testimony regarding the probable cause of the Wrights' claimed injuries was simply speculation.
>
> The jury could therefore only have speculated about whether the amount of formaldehyde from Williamette's plant to which each plaintiff was exposed was sufficient to cause their injuries or, indeed, any injuries at all. . . . Without proving hazardous levels of exposure to Williamette's formaldehyde, the Wrights failed to carry their burden of proof at trial on the issue of causation because the evidence failed to support a reasonable inference in favor of the jury's implicit finding against Williamette on the causation issue.

*Wright*, 91 F.3d at 1108.

The district court also was entitled to consider uncontroverted evidence of other possible causes of Mr. Moore's asthmatic condition. First, Mr. Moore had just returned to work after recovering from pneumonia. Second, Mr. Moore was a cigarette smoker. He had smoked about a pack of cigarettes a day for twenty years. Finally, Mr. Moore admitted that he had suffered from asthma as a child.

### E.

I agree with the majority that Dr. Jenkins is a well-qualified pulmonary specialist. But I disagree with the majority's suggestion that when we consider whether an expert has given a scientific opinion we have a sliding scale where the greater the witness' qualifications the less scientific the evidence must be to support the opinion.

In *Rosen v. Ciba-Geigy Corp.*, 78 F.3d 316 (7th Cir.1996), the Seventh Circuit considered the admissibility of a highly qualified medical expert's opinion on causation that lacked formal scientific support. In that case, the plaintiff sought to connect his use of a nicotine patch, to help him stop smoking, to his sudden heart attack. A distinguished cardiologist and department head at the University of Chicago testified that the heart attack was indeed triggered by the use of the nicotine patch. The Seventh Circuit, speaking through Judge Posner, held that the district court correctly declined to permit this testimony because it had an inadequate scientific basis. The court stated: "Under the regime of *Daubert* a district judge asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist." *Id.* at 318(citation omitted).

In summary, I am satisfied that the district court correctly rejected — and certainly did not abuse its discretion in excluding — Dr. Jenkins' testimony as being without sufficient factual or scientific foundation.

### F.

Finally, I am satisfied that even if the district court erred in rejecting this evidence, it was harmless error. As outlined in the majority opinion, the district court permitted Dr. Jenkins to testify about his examination and testing of Mr. Moore. The district court also admitted Dr. Jenkins' conclusion that Mr. Moore was suffering from RAD, along with his prediction for future treatment and disability.

Dr. Jenkins' and Dr. Alvarez's testimony was completely consistent except that Dr. Jenkins' examination and tests were arguably more comprehensive than Dr. Alvarez's. The district court allowed the plaintiff to produce evidence of Dr. Jenkins' examination and tests, and Dr. Alvarez accepted Dr. Jenkins' findings as accurate. On the causation issue, Dr. Jenkins' proffered testimony was virtually identical to Dr. Alvarez's testimony. Both testified that the Toluene solution was an irritant, that the MSDS established this fact, and that the temporal connection between Mr. Moore's exposure to Toluene and his onset of RAD justified the conclusion that the two were related. Dr. Jenkins suggested no material factual or scientific basis for his opinion on causation that Dr. Alvarez did not rely on. Dr. Jenkins testified that he had never had a previous patient who claimed that Toluene triggered his RAD and he admitted that he conducted no tests on this question. I am unable to see why a jury would have gleaned any assistance from Dr. Jenkins' testimony on the critical causation issue that it did not find in

Dr. Alvarez's testimony. A district court's refusal to permit a party to call two expert witnesses to give cumulative testimony is rarely considered prejudicial error.

As one court observed, where the excluded expert's testimony does not add a new angle or argument to the point at issue, the testimony is considered cumulative and its exclusion is harmless error. *Kendra Oil & Gas, Inc. v. Homco, Ltd.*, 879 F.2d 240 (7th Cir.1989); *see also Collins v. Wayne Corp.*, 621 F.2d 777, 782 (5th Cir.1980); *Miley v. Delta Marine Drilling Co.*, 473 F.2d 856, 858 (5th Cir.1973). Mr. Moore's position on causation was presented by Dr. Alvarez; he was not entitled to have that same position repeated by Dr. Jenkins.

## III.

The Supreme Court has directed the district courts to control with a firm hand expert testimony to prevent litigation abuse so familiar to all of us. The district court took a careful look at Dr. Jenkins' testimony, applied the correct standard, and excluded the testimony. After reviewing the record, I fail to see how the district court could have reached any other conclusion. The majority's "let it all in" view sends exactly the wrong message to conscientious district courts. I therefore dissent.

* * * *

# APPENDIX D — FINAL JUDGMENT OF THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF TEXAS, HOUSTON DIVISION DATED MAY 19, 1995 AND ENTERED MAY 22, 1995

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

CIVIL ACTION NO. H-92-1017

BOB T. MOORE and SUSAN MOORE,

Plaintiffs,

VS.

ASHLAND CHEMICAL, INC., ET AL.,

Defendants.

## FINAL JUDGMENT

On May 2, 1994, the parties consented to proceed before a United States Magistrate Judge, pursuant to 28 U.S.C. § 636(c), for all matters, including the entry of final judgment. This cause then came on for trial by jury on May 15, 1995. The issues having been duly tried and the jury having rendered its verdict, it is hereby

ORDERED that the Plaintiffs take nothing, that the action be DISMISSED on the merits, and that the costs of this action be borne by the party incurring the same.

This is a FINAL JUDGMENT.

The Clerk shall file this Final Judgment and provide a true copy to all counsel of record.

SIGNED at Houston, Texas, this 19th day of May, 1995.

s/ Mary Milloy
MARY MILLOY
UNITED STATES MAGISTRATE
JUDGE

# APPENDIX E — ORAL RULING OF THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF TEXAS, HOUSTON DIVISION DATED MAY 16, 1995 AND FILED OCTOBER 5, 1995

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

CASE NO. CA H-92-1017

BOB T. MOORE, ET AL.

VERSUS

ASHLAND CHEMICAL INC., ET AL.

HOUSTON, TEXAS
MAY 16, 1995
9:00 O'CLOCK A.M. TO 4:19 O'CLOCK P.M.

VOLUME II OF III, PGS 131-267

TRIAL – DAY 2

BEFORE THE HON. MARY MILLOY, UNITED STATES MAGISTRATE JUDGE

* * *

[154] **THE COURT:** All right. I had offered an opportunity to develop a record. Plaintiff declined it. I let you flesh out the record here today, Mr. Green.

But I don't think this meets the 702 test — that is, that scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or determine a fact in issue. And I say that for a number of reasons.

Number one, at his deposition it seems as if Dr. Jenkins was indicating that Mr. Moore had reactive airways disease that may have been aggravated by an exposure. When asked if there was any scientific support for a diagnosis of causation between exposure to toluene and reactive airways disease, he had no such literature or research to back up such causation determination. Testified that he know of only one person who had either developed or had a condition aggravated by exposure to toluene — toluene, and that was Mr. Moore. Today he said nothing other than he relied upon the MSDS, which listed a number of other chemicals, and from that stated that some of these other chemicals are known to lead to reactive airways disease, ergo his conclusion that toluene leads to reactive airways disease.

And I would submit to you that an association does not equal causation, number one.

Number two, on cross examination when asked about the specific substances detailed in the medical literature where [155] exposure had led to reactive airways disease, Dr. Jenkins admitted that those were much more harmful chemicals.

So even if the record could be read to meet the test under 702, I think Dr. Jenkins' testimony as to causation in this particular case is excluded under Rule 403, as I find that it would be highly prejudicial and misleading to have the jury accept from Dr. Jenkins's history and credentials that his opinion as to causation is other than scientific speculation, because that's what I heard him to testify to.

I would also point out that I'm slightly disturbed by the fact that he was suddenly presented with the case study when none had been mentioned or known or recited before. And I'm referencing the Brooks article, Mr. Green, that you tendered to him on your redirect examination outside the jury's presence.

Last but not least, I don't know why, if his entire causation testimony is based upon the MSDS, that his testimony would be necessary since the MSDS is in evidence and the MSDS recites that under certain circumstance this substance may be irritant to throat and nose, and vapors may injure, quote, "blood, liver, lungs, kidney, and nervous system depending upon the degree and the effects of concentration and length of exposure."

I would also note for the record that, although not developed at this hearing this morning, at his deposition Dr. Jenkins testified that he had no information concerning level of [156] exposure, amount of exposure, and duration of exposure.

Last but not least, although you did make a record, Mr. Green, about what Dr. Jenkins did to develop a diagnosis of Mr. Moore as suffering from reactive airways disease, that you deemed his methodology is not what's at issue in determining the basis for his opinion as to causation. Dr. Jenkins acknowledged here this morning that even if he's relying upon the MSDS and whatever research went into its conclusion and comments and cautionary notes, he does not know what those comments and cautionary notes are based upon, because he does not know what research was used and logically does not know the reliability of any research technique that went into the compilation of the conclusions in the MSDS.

* * * *

# APPENDIX F — ORDER OF THE UNITED STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT DENYING PETITION FOR REHEARING DATED AND FILED SEPTEMBER 18, 1998

IN THE UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 95-20492

BOB T MOORE; SUSAN MOORE

Plaintiffs - Appellants-Cross-Appellees

v.

ASHLAND CHEMICAL INC; ASHLAND OIL INC

Defendants - Appellees-Cross-Appellants

and

DOW CORNING CORPORATION; CDC SERVICES INC

Defendants

Appeals from the United States District Court for the
Southern District of Texas, Houston

## ON PETITION FOR REHEARING

Before KING, JOLLY, HIGGINBOTHAM, DAVIS, JONES, SMITH, DUHÉ, WIENER, BARKSDALE, EMILIO M GARZA, DeMOSS, BENAVIDES, STEWART, PARKER, and DENNIS, Circuit Judges.

PER CURIAM:

IT IS ORDERED that the petition for rehearing filed in the above case is denied.

ENTERED FOR THE COURT:

s/ illegible
United States Circuit Judge

* JAMES L. DENNIS, Circuit Judge, dissenting.